STATE DATA MODERNIZATION PLAYBOOK

October 2020

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PLAYBOOK OVERVIEW | INTRODUCTION

Background & Goals

- The goal of the State Data Modernization Playbook is to provide a set of tools and resources to guide an assessment, gap analysis and future state design of a state data system
- The Playbook elements have been designed to be broadly applicable to states and across different sectors of state data

Target Audience & Using the Playbook

- The Playbook is targeted towards organizations conducting a deep-dive assessment of a single state data aggregator who covers either one data sector (e.g. higher education) or cross-sector data (e.g. P-20W)
- The Playbook and all the elements are designed around an Assessment Framework. The Playbook elements and framework categories can be used in a modular way
- The Playbook elements consist of a mix of PowerPoint templates (included here) and more comprehensive Excel and PowerPoint tools (described here with references to the complete tools)

PLAYBOOK OVERVIEW | TAXONOMY

The following terms are referenced in this document.

Individuals / Organizations:

- **Data Aggregator:** Organization that collects, links, enriches, and shares data to develop insights
- **Data Consumer:** Any organization or individual that accesses data from aggregators to draw insights
- **Institutions:** Education institutions that function as data providers
- **Data Provider:** Any organization that collects individual data and provides it to a data aggregator

Other Terms:

- **P-20W:** Includes pre-school, K-12, higher education and workforce sectors
- **Persona:** Data-driven archetype that describes the goals and observed behavior patterns, expectations, and needs of a cluster of stakeholders
- **Sector:** Portion of P-20W set (e.g., Pre-school, K-12)
- **State Longitudinal Data System (SLDS):** Data set that connects individual-level data over time

CURRENT STATE ASSESSMENT TEMPLATES

1. Assessment Framework
2. Data Request
3. Interview Guides
4. Personas, Use Cases, and Voice of the Customer
5. Systems Architecture Evaluation

ASSESSMENT FRAMEWORK | OVERVIEW

Playbook Element Overview

Objective: To provide a framework for evaluating a state data system grounded in key design principles

Target Audience(s): Organizations conducting state data assessments, organizations in the process of designing new state data systems

Format of the Element

PowerPoint slides, included in this Playbook

- *Design Principles:* Defines nine tenants that guide optimal design of state data systems
- *Analysis Areas:* Identifies detailed areas for analysis within each design principle area

How to Use the Element

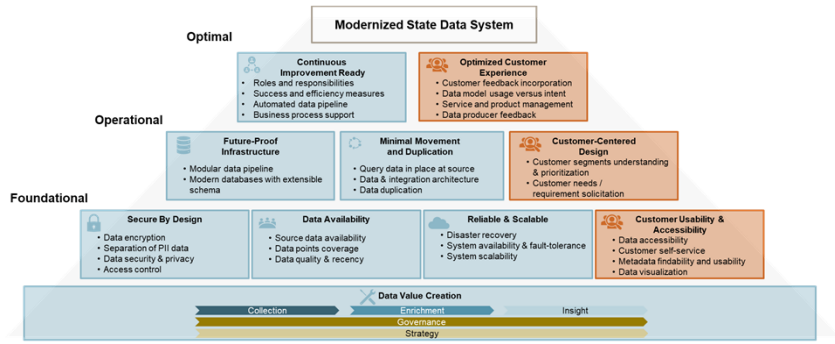
- Determine the scope of, and goals for, the state data assessment
- Identify specific Assessment Framework areas that are relevant to the assessment
- Identify other Playbook elements to be used based on selected Assessment Framework areas

Dependencies on Other Playbook Elements

The Assessment Framework is an organizing mechanism for all the other current state Playbook elements but is not dependent specifically on any others.

Relevant Assessment Framework Principles

- All

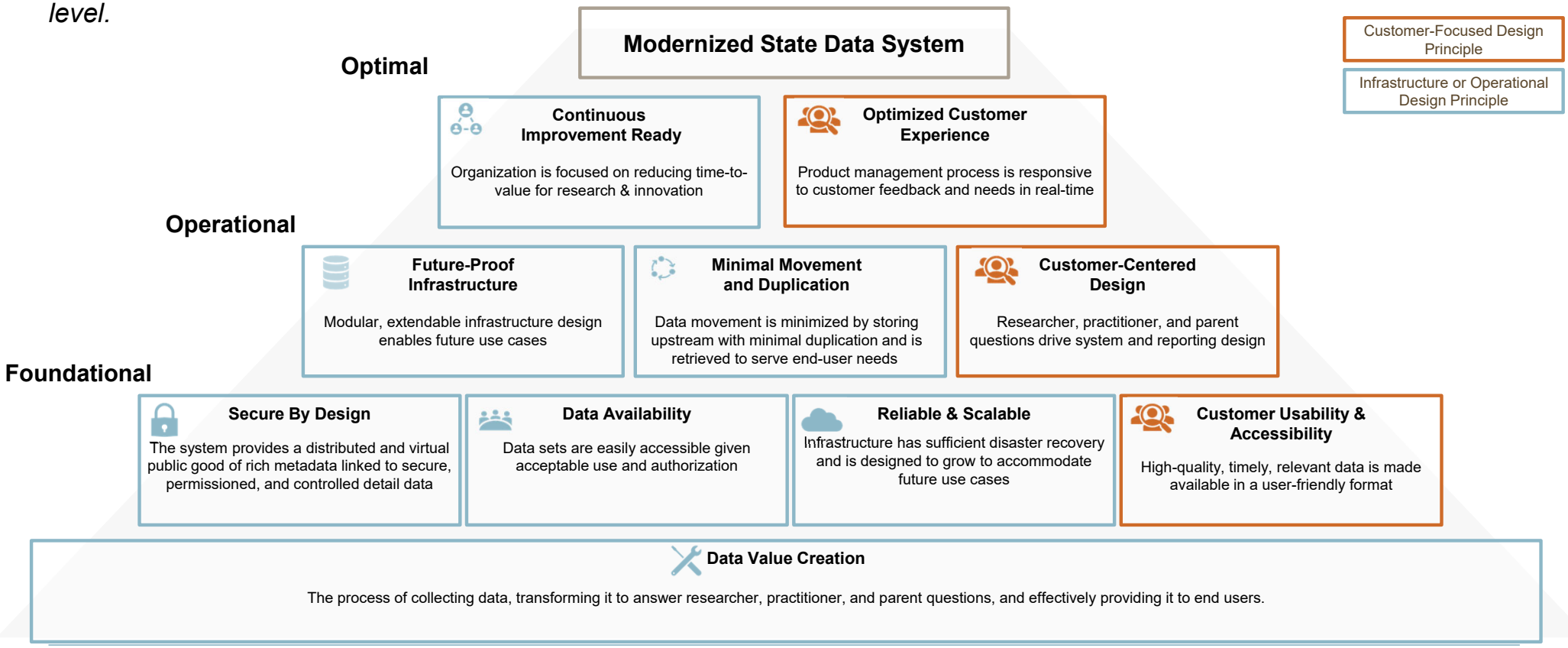


Key Inputs

- Directional understanding of the needs and issues currently experienced in a state data system
- Input from key contacts at the state data organization/agency
- Understanding of the assessment goals
- Identified organization to conduct the assessment

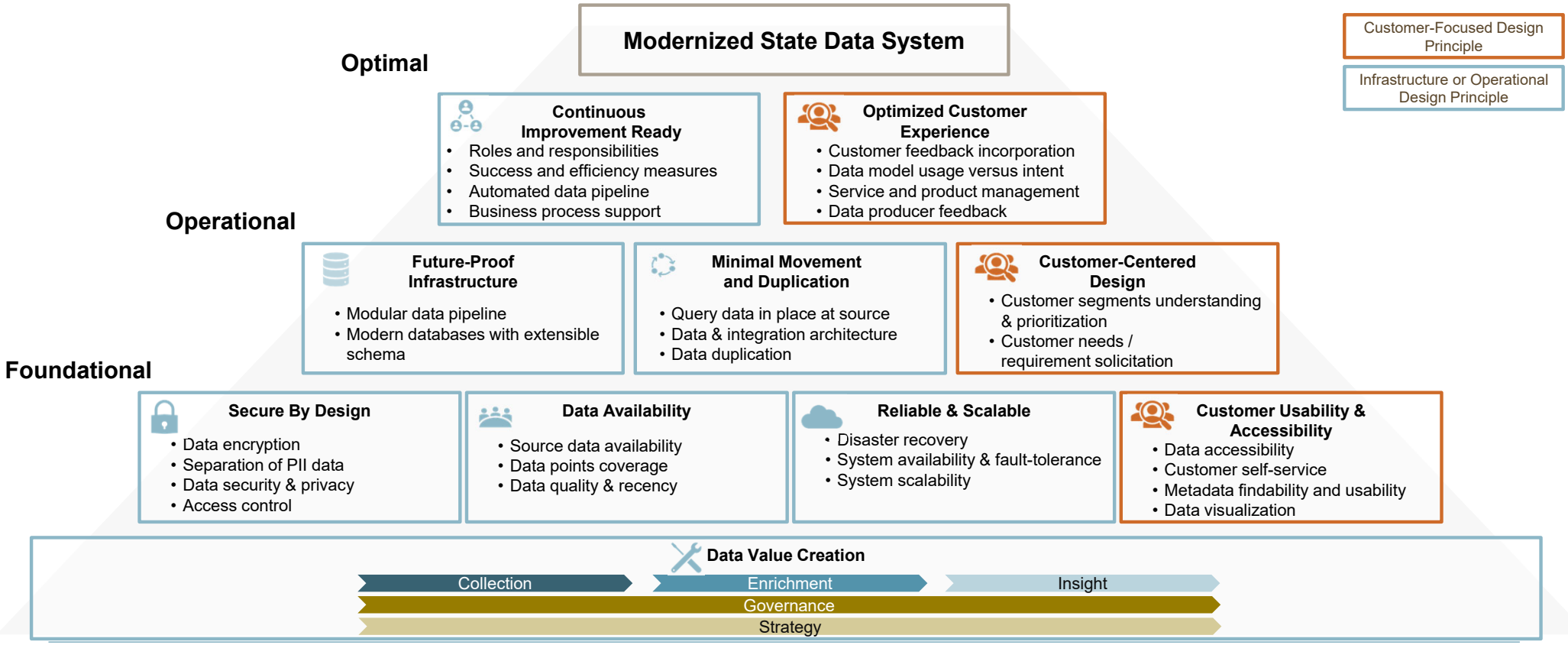
ASSESSMENT FRAMEWORK | DESIGN PRINCIPLES

A modern state data system requires designing or re-designing systems and processes to support the needs of end-users. A state data aggregator can be characterized by a general level of maturity, and specific principles are appropriate at each level.



ASSESSMENT FRAMEWORK | ANALYSIS AREAS

The Assessment Framework is organized around the State Data Modernization Design Principles. These principles are broken down into specific areas for analysis and assessment.



DATA REQUEST | OVERVIEW

Playbook Element Overview

Objective: To outline existing documentation to collect from an assessed state data aggregator to inform the current state assessment; can filter by Assessment Framework areas

Target Audience: Organizations conducting state data assessments, particularly those focused on assessing the infrastructure and operational elements of the system

Format of the Element

Excel document with two tabs:

- *Data Request Tracker Tab*: identifies which documents to request from the assessed organization and how elements relate to the Assessment Framework
- *File Analysis Tab*: lists files returned by target organization and their relationship to the data request tab; includes file name, summary of file contents, and relevance of file for assessment
- *Fulfillment Summary Tab*: simple pivot table summarizing status of file receipt

How to Use the Element

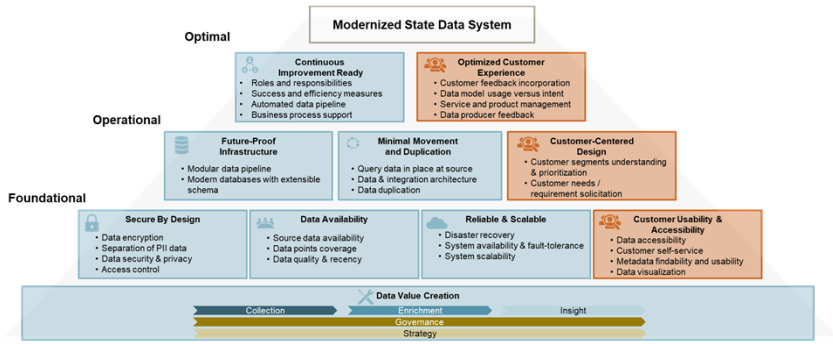
- Identify primary assessment goals
- Filter data request tab by design principles to be targeted
- Sort data request line items by helpfulness
- Submit data request to relevant parties
- Identify files submitted in response to the data request from the client
- Use the file analysis tab to pair file relationships with the data request tab, summarize file contents, and sort the relevance of the file to each of the assessment elements

Dependencies on Other Playbook Elements

Dependent on the selected sections of the Assessment Framework

Relevant Assessment Framework Principles

- All, data request submitted to relevant parties will depend on objective of assessment



Key Inputs

- Understanding of assessment goals
- Input from key contacts at the state data organization/agency
- Single point of contact at the assessed state data aggregator to orchestrate and respond to data request
- File sharing methodology (e.g., Teams, Box, Dropbox, etc.)

DATA REQUEST | TRACKER

Use the data request tracker to select relevant files and information to request and then to track which requests were completed, delayed, or unable to be fulfilled.

Create a central, shared file repository where the data aggregator employees can upload files in response to the data request

The design principle column indicates what data requests are relevant to which design principle(s)

Based on the focus of an assessment, users can prioritize items on the data request

Track the date each data request was returned to the assessment team for project management purposes

Indicate which data aggregator employee is responsible for providing the data request

Data Modernization Project - Data Request File

Please upload files to XXXXXXXXXX

ID#	Request	Design Principle(s)	Priority	Date Requested	Date Received	Status	Assigned To	File Name	Comments
1	Reporting Systems Landscape 1) List of business systems (enterprise applications) which support key reporting functions 2) List of reporting applications and tools 3) Architecture diagram(s) and data flow diagram(s) representing up/downstream transactional systems, internal/external interfaces, data repositories (e.g. Data Warehouse), data flows, analytics/reporting tools, etc. 4) List of data sources; please notate manual collection vs automated data feeds	Data Value Creation, Minimal Movement and Duplication, Future-Proof Infrastructure							
2	Documentation on data collection and data transformation processes, process maps, procedures	Data Value Creation							
3	Data dictionary and measures definitions	Data Value Creation							
4	Current size of in-scope data repositories and growth trend by quarter for last 8 quarters	Future-Proof Infrastructure							

Track the date each data request was submitted to the data aggregator for project management purposes

Use this column to add comments about the file (either from the assessment team or from the data aggregator staff)

Prior assessments have revealed that requesting a reporting systems landscape is particularly helpful in understanding the current state of the data aggregator organization

Some data requests will not be able to be fulfilled by the data aggregator; in this case, requests can be answered during interviews and others may not be fulfillable because the data aggregator's maturity is low for that design principle

After the data request is fulfilled, indicate what the file name is in this column for traceability purposes

DATA REQUEST | FILE ANALYSIS

Use the file analysis tool to analyze data request submissions, summarize content, create hypotheses, brainstorm follow up questions, and answer key questions.

Denote the related line of the data request tracker is fulfilled by this file

Note any key insights that are gained based on the review of the provided data request file

High-level description of the contents of the file

Indicate any questions the assessor has for the data aggregator employee that provided / is responsible for the file submitted

File Analysis

#	Data Request Line	File Name	Relevance / Insightfulness	Insights / Hypotheses	Overview	Next Steps	Questions for Organizational Stakeholder	Comments
1	Reporting Systems Landscape 1) List of business systems (enterprise applications) which support key reporting functions	File_Name_ABC_DEF	1 - High	Organization has a patchwork of applications, each built for a single purpose, with likely no integration or coordinating between them	Catalog of 140 applications: 98 flagged as in scope	Capture additional attributes such as "Data Collection is the Primary Purpose (T/F)" and "User Category" in order to inform application landscape and general understanding		

Track next steps that arise from the file submission in this column for project management purposes (e.g., scheduling interviews with key stakeholders, additional analysis to be completed)

Use this column to add comments about the file

Reference the file name that is being analyzed in a particular row. The file name should reference where the file is stored on the central, shared file repository

Prior assessments have revealed that some files provided will not be as relevant to the assessment than others; use this column to denote which files are the most helpful to streamline data gathering by the assessment team

INTERVIEW GUIDE | OVERVIEW

Playbook Element Overview

Objective: To provide sample question sets for both internal assessed organization staff and external stakeholders; questions are tied to the Assessment Framework

Target Audience: Individuals assessing target organization

Format of the Element

Word document that demonstrates the connection between the assessment framework and sample interview questions and contains the following key sections:

- *How to Guide:* Instructs users on how to use the interview guide and the limitations of the tool
- *Diagnostic Questions:* Lists questions to ask key stakeholders in order to help direct assessment focus and goals
- *Interview Warm-Up Questions:* Demonstrates sample questions to ask stakeholders when beginning an interview
- *Sample Interview Questions:* Lists sample questions to ask stakeholders by design principle, assessment criteria, and interviewee type
- *Sample Voice of the Customer Questions:* Compiles external stakeholder interview questions into one page for developing Voice of the Customer and User Persona development

How to Use the Element

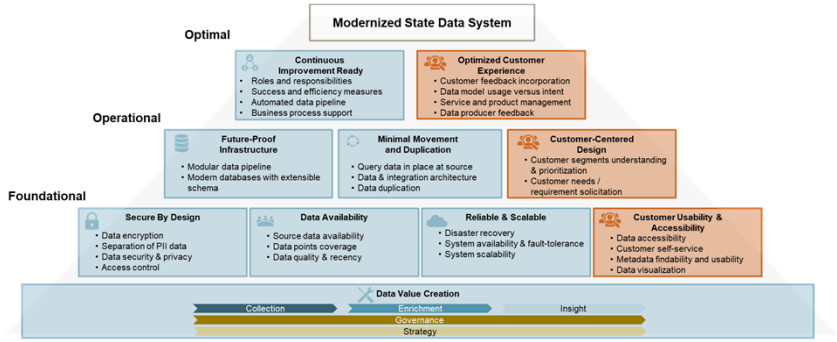
- Based on Assessment Framework areas selected, identify interviewee types to be engaged
- Identify specific interviewees & schedule interviews
- Review interview guides and identify highest priority questions to be answered
- Conduct interviews and document responses

Dependencies on Other Playbook Elements

Dependent on the Assessment Framework

Relevant Assessment Framework Principles

- All, data request submitted to client will depend on objective of assessment



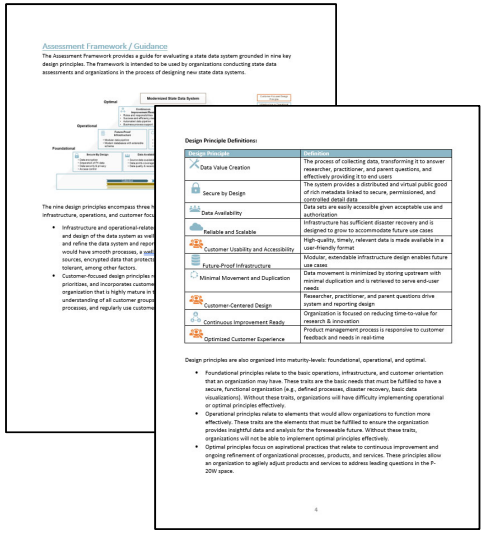
Key Inputs

- Understanding of assessment goals
- Identified interviewees from:
  - Assessed organization
  - Key external stakeholders

INTERVIEW GUIDE | SAMPLE ARTIFACTS

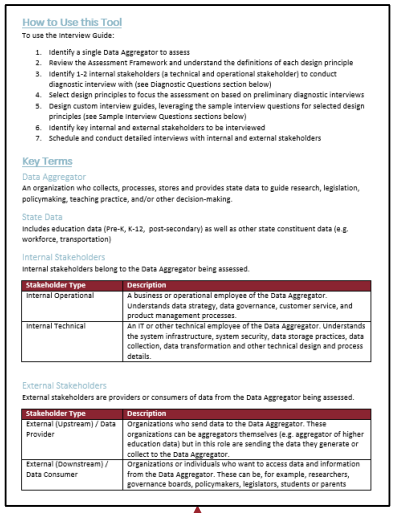
Use the interview guide to frame and refine assessment purpose, identify key stakeholders to interview, and select sample questions to leverage for stakeholder interviews.

Assessment Framework



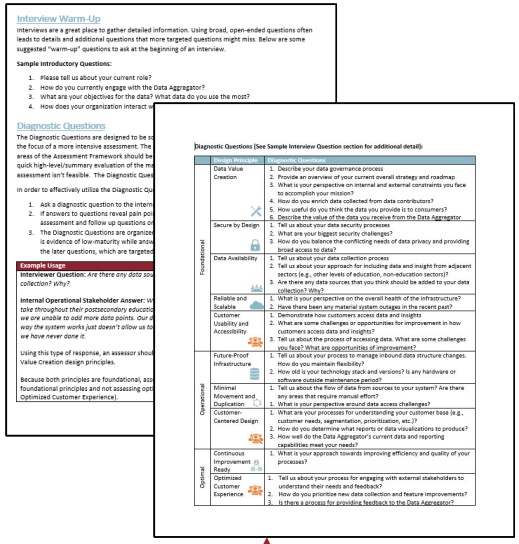
Assessment framework / guidance section allows users to understand how the assessment framework integrates with the interview guide

How to Use the Tool



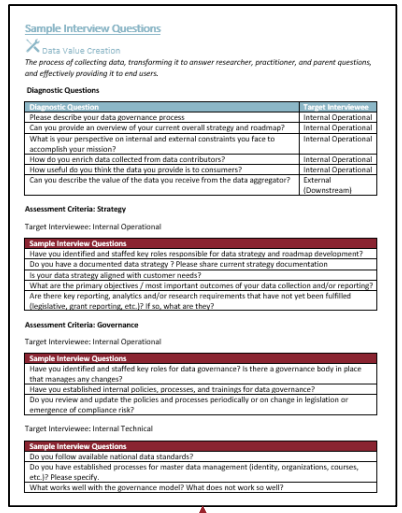
The how-to guide orients users to the interview guide, how to implement diagnostic questions, and identify key stakeholder types to interview based on the assessment

Diagnostic Questions



Diagnostic questions are a brief set of open-ended questions to be used to understand and focus priority assessment areas

Sample Interview Questions



Sample interview questions to inform interviews for individualized assessments. Includes warm-up questions and Voice of the Customer questions

USER PERSONAS, USE CASES, & VOICE OF THE CUSTOMER | OVERVIEW

Playbook Element Overview

Objective: Provides a simple way to profile and categorize external customer feedback into key themes. Used to identify strengths and opportunities for further analysis or inform solution design

Target Audience: Assessed organization leaders/operators

Format of the Element

PowerPoint templates, fully incorporated in this playbook:

- *Persona Summary:* a starting set of high-level strategic personas
- *Persona Template:* Identifies levers for what characterizes or constrains each external stakeholder type (e.g., pain points); includes example content for guidance
- *Use Cases Template*: Includes key characterizing research questions or other uses of the assessed organization's data; includes example content for guidance
- *VoC Summary Template*: Identifies strengths and opportunities by key analysis area
- *What We Heard Template*: Presents direct quotes from customers to understand key pain points and areas of success for the data aggregator

How to Use the Element

Based on information collected through the interview process:

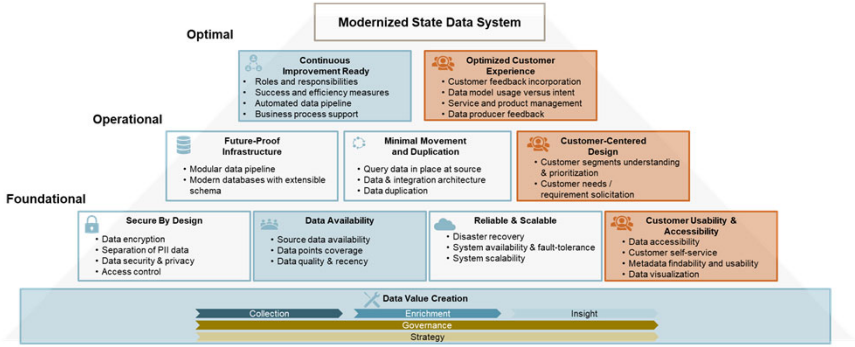
- Summarize interview responses by customer type as exemplified by the user personas
- Identify common research questions or other data use cases identified by stakeholders
- Identify key themes, strengths, and opportunities
- Select key quotes from interviews to present in 'what we heard'
- Highlight common pain point and opportunity areas for review

Dependencies on Other Playbook Elements

Informed by the Assessment Framework and the Interview Guides; deliverables can be built around individual Personas depending on how many interviews are conducted

Relevant Assessment Framework Principles

- Customer-centered design, customer usability & accessibility, optimized customer experience, continuous improvement read, data availability, and purposefully-linked data



Key Inputs

- Understanding of customer landscape and priorities
- Stakeholder interviews with:
  - Data aggregator leader/operator (to direct which providers / consumers should be targeted)
  - Data providers/consumers business leaders/operators
  - Data providers/consumers technical SMEs

PERSONA SUMMARY | STATE DATA AGGREGATOR EXAMPLES

While there may be additional personas developed through a specific assessment, the following list represents a common set of stakeholders that are of interest in an assessment of a Data Aggregator. This list can be used as a starting place.

Persona	Key Objectives
Greg, Researcher	• Conduct research on education topics, including policies, practices, interventions and innovations • Study relationships between education practices & impact • Provide research to policymakers and practitioners to improve educational outcomes for all students
Carl, Advocacy Organization Lead	• Build and share evidence for interventions and solutions that work to help close the postsecondary achievement gap for black and Hispanic students • Help funders and influencers better understand the barriers to student success for specific student populations at the postsecondary level • Empower students to find an education and career path that fits their needs
Lina, Community College President	• Ensure stable or increasing revenue to support campus programs and operations • Grow enrollment, in line with the growth of the community • Provide each student with the opportunity and support to earn a degree of value in the workplace • Be recognized as a leading institution amongst her peers • Serve to improve the local community by working with students, businesses, and local leaders
Alex, Head of Campus Advancement – Rural Community College	• Provide timely insights to campus team to inform strategic and operational decisions, including decisions that will impact enrollment and student outcomes • Provide evidence of success so that there is a value story to partners and funders (for new programs, athletics, employer pipelines, etc.) • Build a culture of data use amongst the college leadership team and decision-makers • Improve internal reporting accuracy and efficiency / reduce time spent on lower-value add data efforts
Theresa, Institutional Researcher	• Use modeling and analytics to identify trends in student growth inside and outside of the state, with details that will enable the system to better position and invest across all campuses • Oversee development of reports that provide a full and evolving view of performance across their varied group of schools in the system. • Identify insights to drive innovative programs and solutions for student success that are impactful and recognized as leading in the field (among peers, leadership team, prospective students and families)
Anya, Policy Lead, Government Executive Office	• Understand impacts of constituent interactions with state services • Use aggregate data to construct policy and funding decisions • Understand links between education, foster care, criminal justice, and social services and outcomes • Optimize state spend across all programs

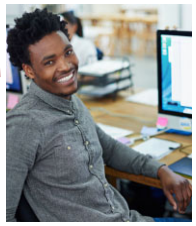
PERSONA TEMPLATE | *PERSONA TYPE* | *PERSONA NAME, ROLE*

Name individual personas based on jobs individuals do, the places they work, and objectives they have in interacting with the Data Aggregator

Key Objectives

- Conduct research on education topics, including policies, practices, interventions and innovations
- Study relationships between education practices & impact
- Provide research to policymakers and practitioners to improve educational outcomes for a

Use unique photos for each persona to help readers to personalize the content



Highlight key objectives that each persona has in general, including how they interact with the Data Aggregator

Major Pains / Limitations for Data

1. Limited capacity to match and … different state data sectors
2. Limited access to longitudinal …
3. Access to data after it is requested is slow (6-12+ months)
4. Data sharing agreements for each research request are customized, requiring significant time and effort
5. … and … res …

Identify key pain points that this persona-type has today. Focused on interactions with the Data Aggregator

Data Needs / Wants

… tudent-level and practitioner-level … raw policy insights across sectors and … eas to improve educational outcomes …

2. Raw data, easy to download in order to manipulate and support a story of student needs
3. A clear understanding or documentation of data collection and cross-sector linking methodologies in order to defend research and conclusions
4. Data provided on a timely basis to maintain the timelines on research and grant projects

Summarize opportunities for improvement that were discussed during Voice of the Customer interviews for this persona. Focused on interactions with the Data Aggregator

Data Use Cases (& Examples)

- A Provide better linkages & longitudinal views
- G Answer strategic policy questions
- H Understand and measure educational outcomes

List key use cases and examples that align to the intent and data use linked to persona

STRATEGIC USE CASE TEMPLATE | ORIENTATION

This template provides a structure for summarizing uses of state data; developed use cases can be more or less detailed based on the assessment. The use cases can be mapped to specific user personas to ensure there is linkage among assessment findings.

Use Case A: Provide better linkages and longitudinal views

Success scenario: a user is able to easily navigate purposefully-linked, g… types and levels of institutions and the workforce, in order to support their i… pathways to a degree of value.

For example: I want to…

1) I want to… …es so that I can make informed changes to degrees, depts, student s… …athway, especially for low-income, minority and first-generati…
2) I want to… …tution by looking at post-certification/degree earnings and education debt by students type and pathway against my peers so I can make adjustments and share the value story with funders
3) I want to know what happened to the students who transferred from my institution: with information on their paths (time to completion, degree, etc.) and outcomes, so I can adjust services and strengthen connections and alignment to other institutions
4) I want to know the background (high school, test scores, prior college experience, etc.) of the students who have succeeded or dropped out o… …we can be better support student success

Use case names summarize the end objective that any individual or organization may have for the Data Aggregator's services

Highlight the optimal outcome of this use case. Success scenarios are not current-state summaries, but an ideal customer interaction

Identify key examples of why individuals or institutions would use this use case to provide specific concepts to evaluate the needs and wants of various personas.

Provide quotes collected through the interview process to bolster evidence of what customers want / need when it comes to particular use cases

"We want more statewide high school data. We want more dual credit information, what high school they came from, etc. WE want to push the agreement between data aggregators to do more, which can help solve the issue of matching."
- Community College IR Lead

"Create a transfer student report. Right now I have to piece together on my own with NSC data. This would be really helpful to the community colleges of the state."
- Community College IR Lead

"We are pulling together pieces of information instead of having one source of truth. I spend so much free time pulling common data sets to help educate my team on where and h…
…ader

"E… …ave to… …We b… …or's data. If the data aggregator did that, it would be a game changer."
- Large University, IR Lead

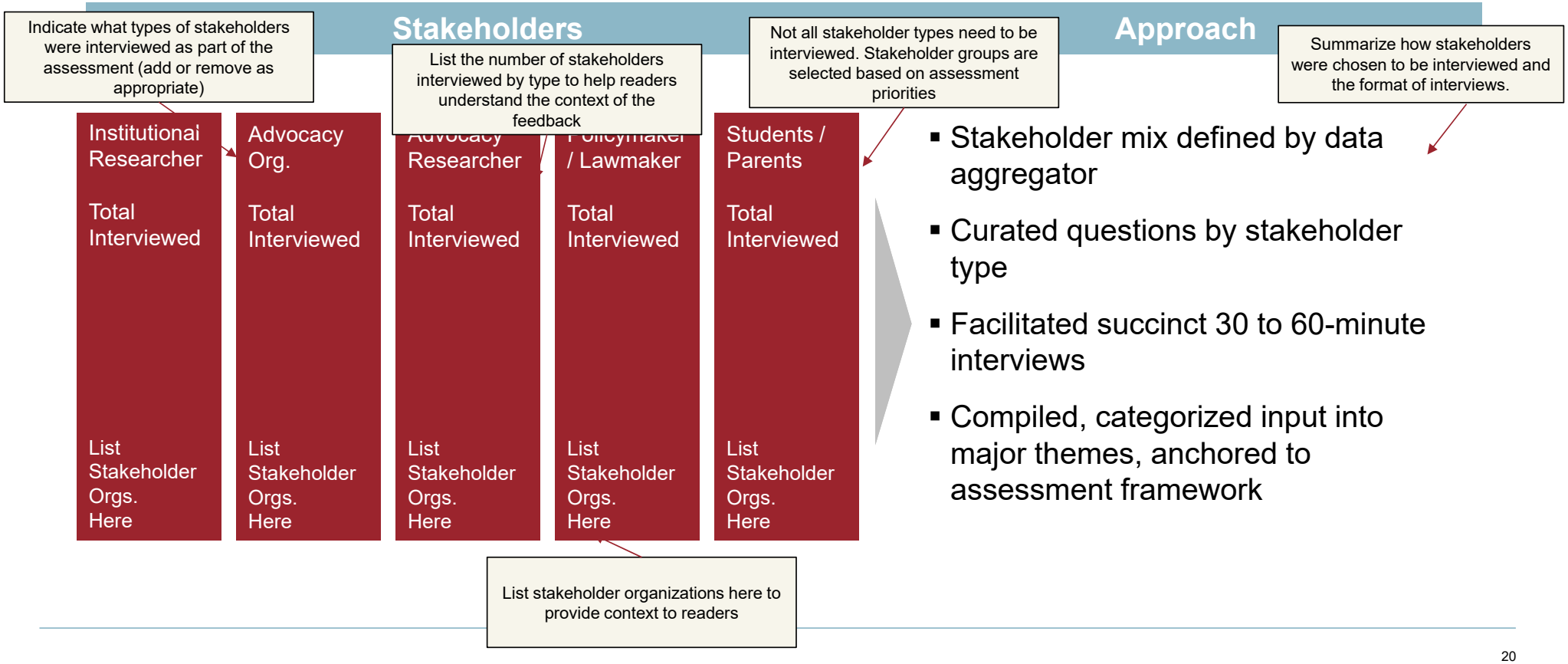
USE CASE EXAMPLES

While there may be additional use cases developed through a specific assessment, the following list represents a common set of use cases that are of interest to a Data Aggregator. This list can be used as a starting place and completed use case templates for each are included in the Appendix.

Case	Description	Success Scenario
A	Provide better linkages and longitudinal views	A user can easily navigate purposefully-linked, granular data about students who move across types and levels of institutions and the workforce, in order to support their institution's role in better, more efficient pathways to a degree of value.
B	Support continuous improvement	High quality data is provided more frequently and at a granular level that allows institutions to evaluate performance across their cohort to identify patterns in programs and initiatives that produce quality student outcomes. Data aggregator understands institutional needs and proactively provides guidance when they find evidence of things that are working.
C	Collaborate and share strategic insights	The data aggregator leverages their central role and statewide view to act as a connector and strategic partner to support institutions that are looking for data-driven insights, best practices and projections.
D	More easily fulfill state and federal reporting requirements	There are newer, better processes for submitting data to the data aggregator supported by defined change management practices that include user feedback. Users have access to some data prior to state-wide certification.
E	Use demographic and financial aid details for analysis	To better align with state goals, users need to access more detailed data, and in particular demographic details to support equity and financial aid data to understand and control education costs.
F	Perform better forecasting	By providing users access to richer data, more frequently and proactively, the data aggregator recognizes and supports predictive analytics and innovative modeling approaches that users have adopted
G	Answer strategic policy questions	Rich, linked data is more easily accessible to a broad number of users, tied to real business decisions that need to be made as well as to policy insights and decisions
H	Understand and measure educational outcomes	A user can access and utilize linked, granular data about various entities (e.g., students, institutions from Pre-K to the workforce, teachers, etc.), in order to understand the impact of different variables on educational outcomes to understand the success of educational programs and policies.
I	Assess programmatic outcomes	A user can understand the impact of different variables on a constituent's life journey and programmatic outcomes of select state services and policies via access to linked, granular data about various entities (e.g., students, constituents, state sponsored programs, etc.).

VOICE OF THE CUSTOMER TEMPLATE | ENGAGEMENT SUMMARY

Summarize the assessment approach and stakeholder engagement results using this template.



VOICE OF THE CUSTOMER TEMPLATE | VOC SUMMARY

Summarize the stakeholder feedback and opportunities for improvement at a high level here.

Common Pain Points

- Limited self-service capabilities
- Unable to "click-down" into aggregations w/out engaging the data aggregator
- Data is stale; ineffective for administrative decision making, service design and quality management, including addressing equity and cost of a degree
- Data aggregator not serving P20W needs of stakeholders due to accessibility, process and data management constraints
- Limited access and linkage forces institutions to source data directly from state/national agencies as the data aggregator and to gain insights

Highlight common or important pain points that were expressed in the voice of the customer interviews. Use these pain points to identify potential areas of improvements / opportunities to investigate through the rest of the assessment

Perceived Value Contribution

- System 1
- Report 1
- Report 2
- Report 3
- Reporting Outcome 1

List areas of value that the data aggregator provides (either systems, reports, or assistance provided to data providers or data consumers)

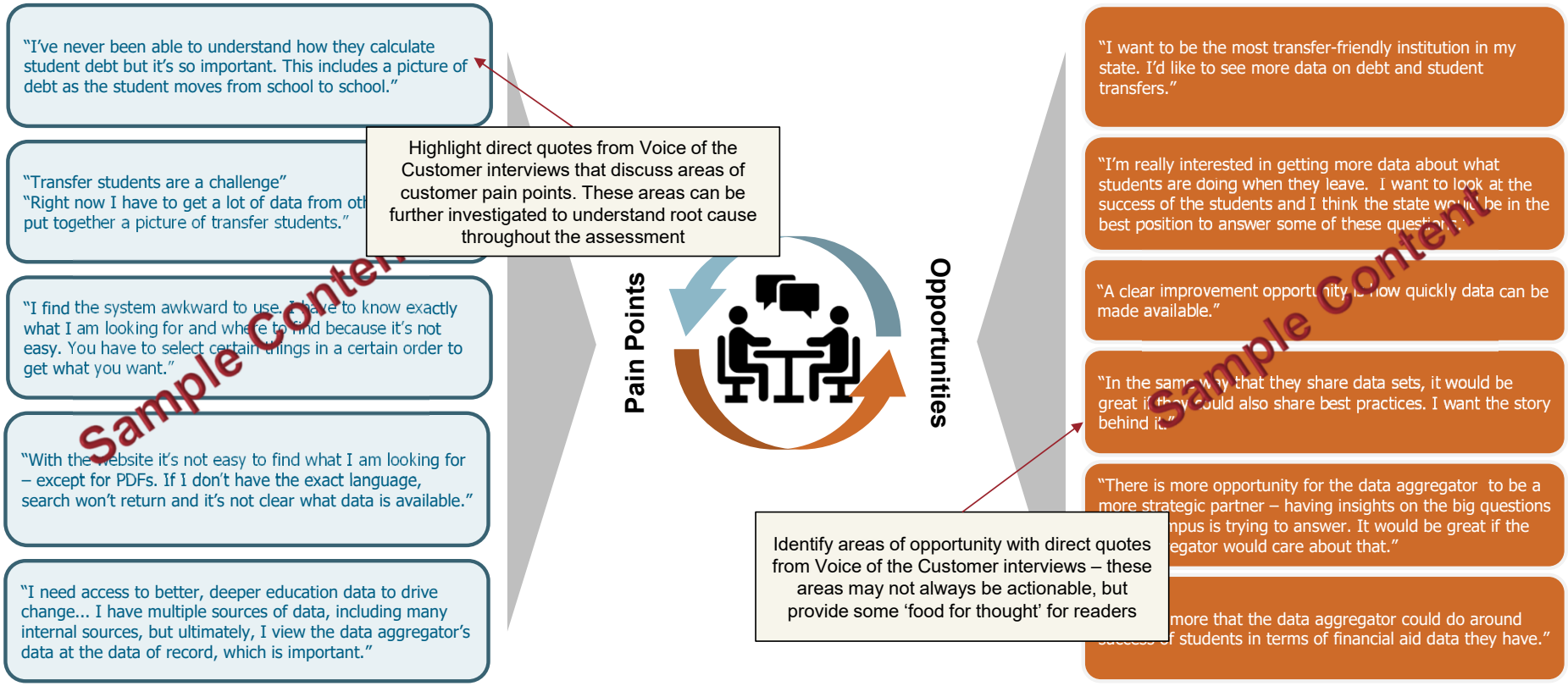
Potential Opportunities

- Expand and increase frequency of data capture
- Expand comparative and predictive capabilities
- Expand self-service and disaggregation capabilities
- Improve data-linkages across the student pathway
- Release partially certified data noting exclusions; notify when data/reports are available or data changes
- Provide POVs based on the data aggregator's analysis of the data
- Provide greater variety of tools/methods and change management for data collection
- Become a more strategic partner, engaging users and build/curate and share new or innovative analytic models
- Foster a culture of innovation

Identify areas of opportunity / potential improvements that were discussed as part of voice of the customer interviews or discovered as a result of common pain points

VOICE OF THE CUSTOMER TEMPLATE | PAIN POINT & OPPORTUNITIES

Include compelling quotations gathered through the stakeholder interview process, especially those that represent common feedback, here.



SYSTEMS ARCHITECTURE | OVERVIEW

Playbook Element Overview

Objective: Outlines data flow, key systems, and interface points in order to visualize system or data flow inputs, processing and outputs. Understand current technology capabilities and gaps.

Target Audience: Technical architects and business operators at the assessed organization & potential vendors seeking to fill gaps in assessed organization's systems architecture

Format of the Element

PowerPoint templates, fully incorporated in this Playbook

- *Business Capability Model:* a model of organizational and system capabilities and how they connect to support a modern data aggregator organization
- *System Capability Model*: model of only system capabilities and how they connect to support a modern system data pipeline – from collect through deliver / publish
- *State Systems Capabilities Evaluation*: a tool to evaluate a Data Aggregator's existing systems against the reference system architecture

How to Use the Element

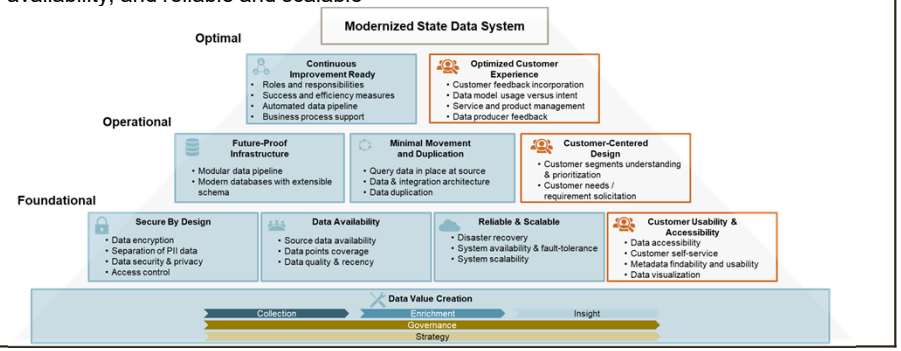
- Identify primary assessment goals
- Determine depth of system architecture element to product (e.g., stakeholder catalog, data flow diagrams, high level architecture diagram, detailed architecture diagram, etc.)
- Deploy the Data Request and conduct technical interviews using the Interview Guide
- Use information gathered to complete the Data Value Creation Evaluation tool, identifying gaps between the Data Aggregator's existing systems and the reference architecture

Dependencies on Other Playbook Elements

Dependent on fulfillment of the Data Request, results from interviews conducted based on the Interview Guide, and the Data Value Creation principle of the Assessment Framework

Relevant Assessment Framework Principles

- All infrastructure or operational design principles: continuous improvement ready, future-proof infrastructure, minimal movement and duplication, secure by design, data availability, and reliable and scalable

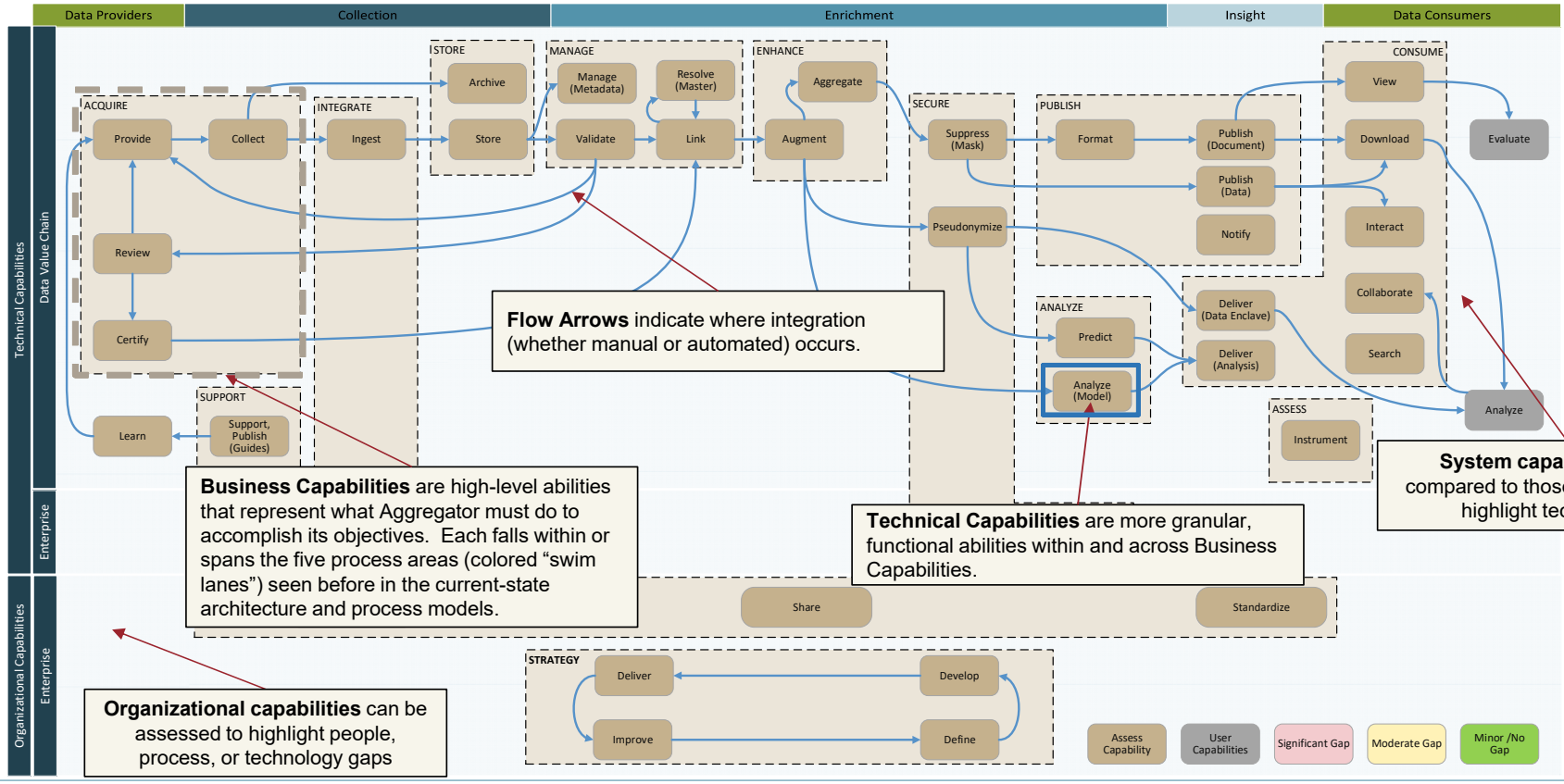


Key Inputs

- Understanding of assessment goals
- Stakeholders interviews:
  - Technical lead at assessed organization
  - Business lead at assessed organization
  - Technical leads at customer organizations
- Data Request results:
  - Process documentation and / or systems landscape documentation
  - Systems Inventory

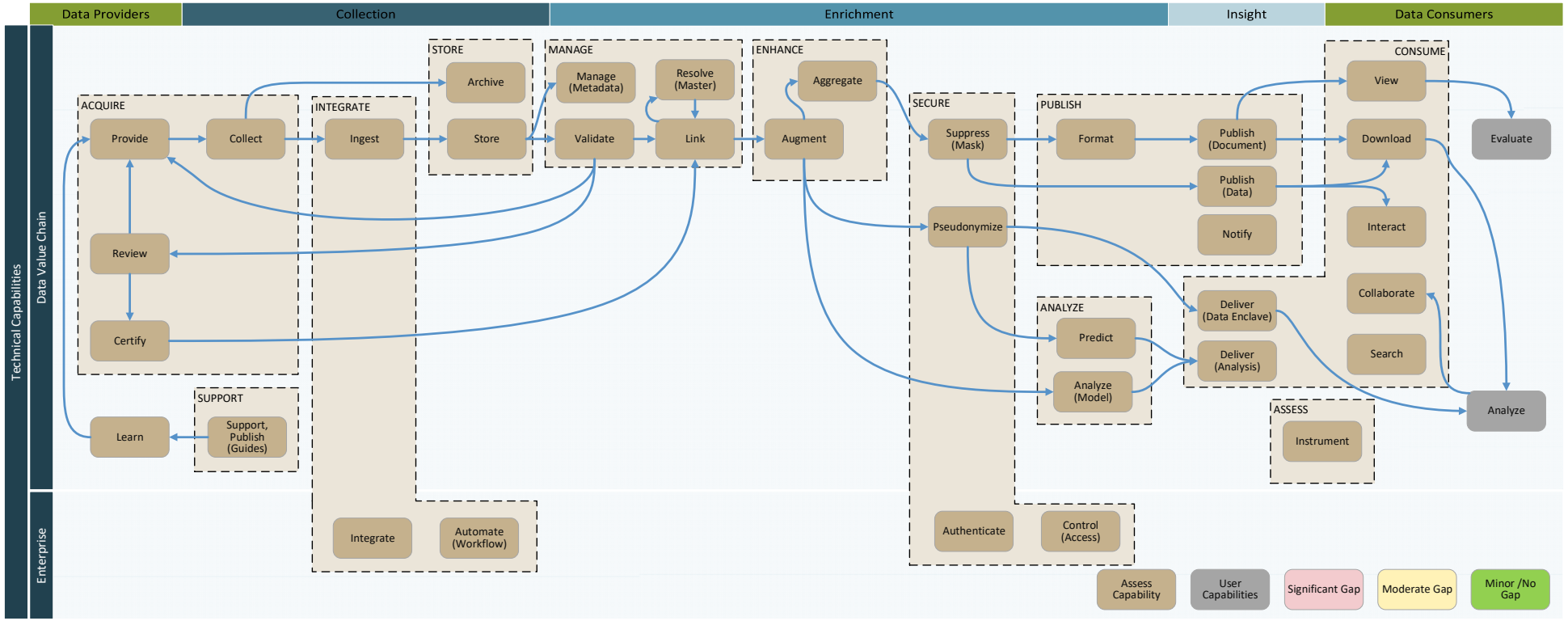
BUSINESS CAPABILITY MODEL

Use the Data Request and Interview responses to fill in an assessment for the Data Aggregator to compare with this sample capability model to be able to highlight gaps in due to people, process, or technology challenges.



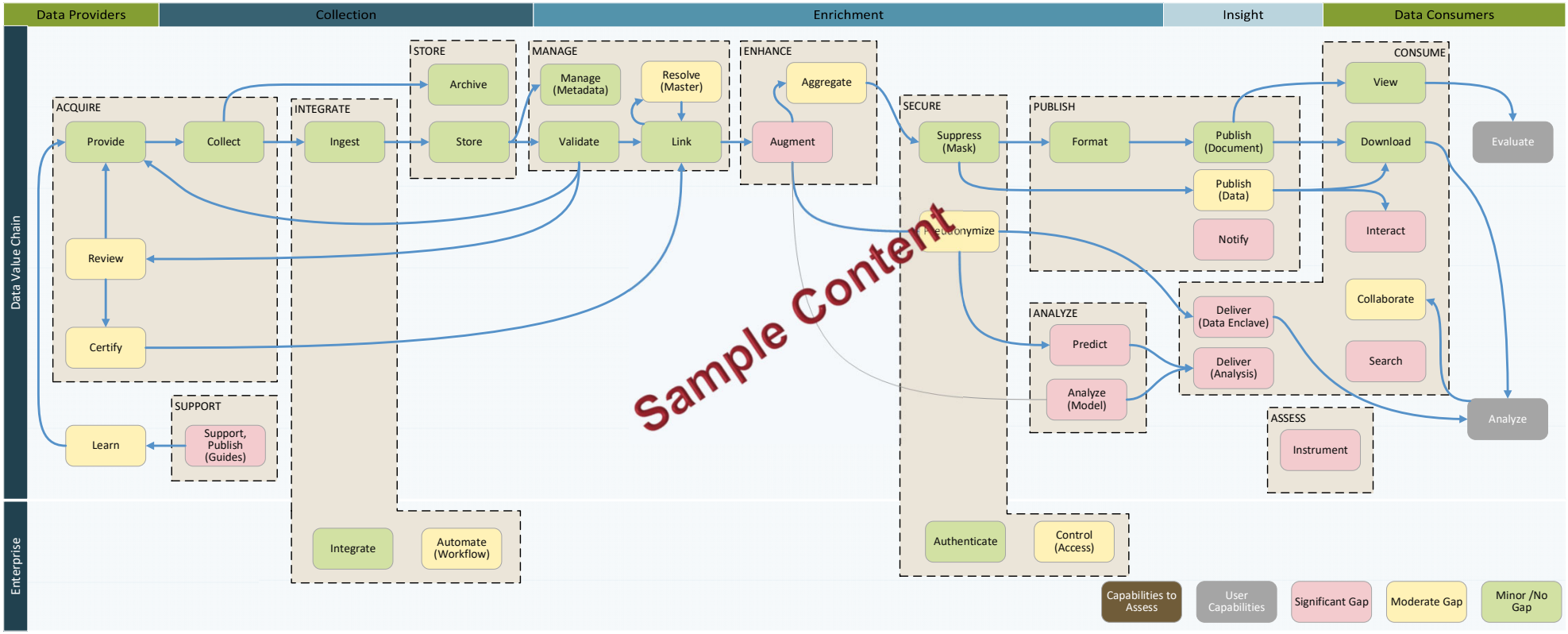
SYSTEM CAPABILITY MODEL

The System Capability Model is a subset of the Business Capability Model and can be used as a starting place for the technical assessment of the Data Aggregator. Use this reference capability model to highlight gaps.



SYSTEM CAPABILITY MODEL | ASSESSMENT EXAMPLE

Use the Data Request and Interview responses to fill in a detailed data value creation systems architecture for the Data Aggregator to compare with the sample reference system capability model to be able to highlight gaps.



STATE DATA SYSTEMS | KEY CAPABILITIES | *EVALUATION TEMPLATE*

Use the Data Request and Interview responses to make an assessment of each value chain component for key capabilities

Collection			Enrichment			Insight			
Acquire	Ingest	Store	Manage	Enhance	Secure	Analyze	Publish	Consume	Support

Value Chain Component	Key Capabilities Needed	Enabling Technology	Assessment & Comments
Acquire	• Role based, secure access for external data providers to submit data	• Identity and Access Management (e.g. Okta IAM, OneLogin) • Managed File Transfer (e.g. Tibco MFT) • API Management (e.g. Apigee, MuleSoft)	• Okta used for IAM
	• Managed, encrypted and scalable data transfer channel for data providers to submit large data files in variety of formats		• Tibco MFT platform used
	• External data pull to securely download large data files from data providers infrastructure		• Data provider is not using SFTP
	• Monitoring and notification for data transfer activities		• No monitoring of data transfer
	• API for external data providers to submit data		• No API for submitting data
Ingest	• Large volume data ingestio	• Data Integration Tools (e.g. Informatica P	• Informatica ETL used
Store	• Scalable, encrypted SQL d	• D A	•
	• Archive source data	• D L	•

Data value chain components and corresponding key capabilities for assessment of system architecture

Typical technologies enable corresponding capabilities

Record the Aggregator's assessment and observed gaps for each capability

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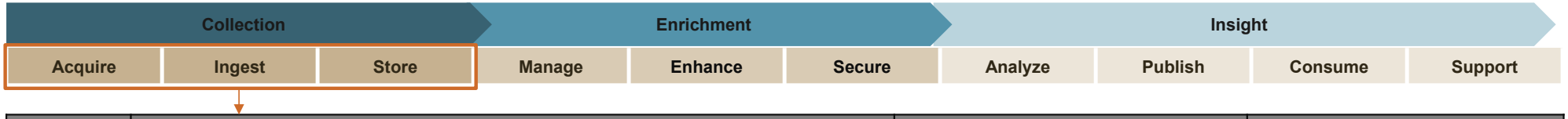
SYSTEM CAPABILITY MODEL ASSESSMENT | COLLECTION COMPONENTS



Value Chain Component	Key Capabilities Needed	Enabling Technology	Assessment & Comments	
Acquire	• Role based, secure access for external data providers to submit data	• Identity and Access Management (e.g. Okta IAM, OneLogin) • Managed File Transfer (e.g. Tibco MFT) • API Management (e.g. Apigee, MuleSoft)		
	• Managed, encrypted and scalable data transfer channel for data providers to submit large data files in variety of formats			
	• External data pull to securely download large data files from data providers infrastructure			
	• Monitoring and notification for data transfer activities			
	• API for external data providers to submit data			
Ingest	• Large volume data ingestion into SQL data store	• Data Integration Tools (e.g. Informatica PowerCenter)		
Store	• Scalable, encrypted SQL data store for analysis of large data sets	• Data Management Solutions for Analytics (e.g. Azure Synapse) • Data Lake Solution (e.g. Azure Data Lake)		
	• Archive source data			

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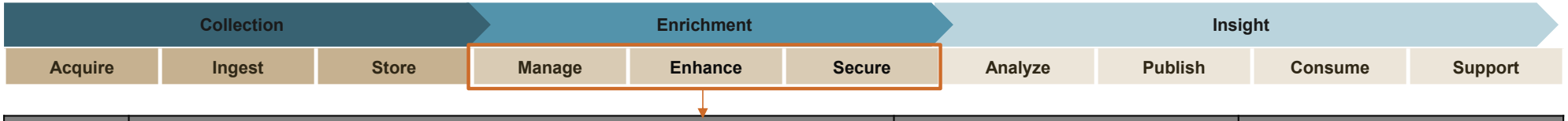
SYSTEM CAPABILITY MODEL ASSESSMENT | ENRICHMENT COMPONENTS



Value Chain Component	Key Capabilities Needed	Enabling Technology	Assessment & Comments	
Manage	• Management of Metadata and data lineage to monitor quality of inbound data	• Metadata Management Solutions (e.g. Azure Data Catalog, Collibra) • Data Quality Solutions (Talend, Informatica) • Master Data Management (e.g. Informatica MDM)		
	• Data Quality validation			
	• Entity resolution to deduplicate and link data across multiple sources			
	• Management of Master Data			
Enhance	• Augment data with machine learning generated insights	• Data Science and Machine Learning Platform (e.g. SAS, Databricks)		
	• Enhance data with often used aggregations for insight			
Secure	• Pseudonymization to de-identify individuals	• Master Data Management • Tokenization Solution (IBM Security Guardiun) • Identity and Access Management		
	• Mask low cell size data points			
	• Internal and External Identify and Access Management			

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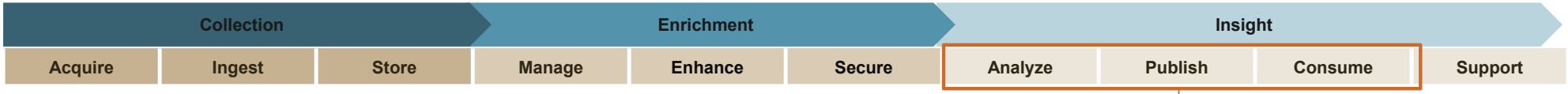
SYSTEM CAPABILITY MODEL ASSESSMENT | INSIGHT COMPONENTS



Value Chain Component	Key Capabilities Needed	Enabling Technology	Assessment & Comments	
Analyze	• Generation of Descriptive Analytics	• Analytics and Business Intelligence Platform (e.g. PowerBI, Tableau) • Data Science and Machine Learning Platform (e.g. SAS, Databricks)		
	• Generation of Predictive Analytics			
Publish	• Format and publish interactive dashboards with drill down	• Content Services Platform (e.g. OpenText, Hyland) • API Management (e.g. Apigee) • Web Content Management System (e.g Adobe) • Collaboration Platform (e.g. Dropbox)		
	• Publish documents with insight			
	• Publish metadata			
	• Publish data through API access			
	• Notify subscriber for their interested data insights			
Consume	• Deliver data through secure enclave	• Managed File Transfer (e.g. Tibco MFT)		
	• Deliver ad-hoc analysis			
	• Collaboration with consumers to support ad-hoc analysis			

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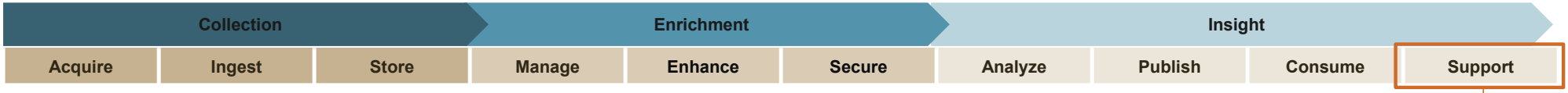
SYSTEM CAPABILITY MODEL ASSESSMENT | INSIGHT COMPONENTS



Value Chain Component	Key Capabilities Needed	Enabling Technology	Assessment & Comments	
Assess	• Instrument to measure user engagement and consumption	• Web Site Analytics Solution (Google Analytics)		
Support	• Stakeholder feedback and continuous Improvement	• Service Management Solution (e.g. ServiceNow)		

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FINDINGS & RECOMMENDATIONS TEMPLATES

1. Assessment Summary Findings
2. Solution Infrastructure Options
3. Vendor Evaluation Template
4. Implementation Roadmap

SUMMARY OF ASSESSMENT FINDINGS | OVERVIEW

Playbook Element Overview

Objective: Provides templates for summarizing and documenting the current state, pains / limitations, and opportunities by Assessment Framework element. Summarizes the assessed organization's ability to meet stakeholder needs for key processes.

Target Audience: Individuals assessing target organization

Format of the Element

Two PowerPoint slide templates:

- *Design Principle Summary:* Documents pain points, opportunities, key activities to complete, cost, and dependencies of improvement to current state by Assessment Framework design principle
- *Data Value Creation Summary:* Maps and documents pain points and limitations through the Data Value Chain to highlight potential areas of technology, people and process investment

How to Use the Element

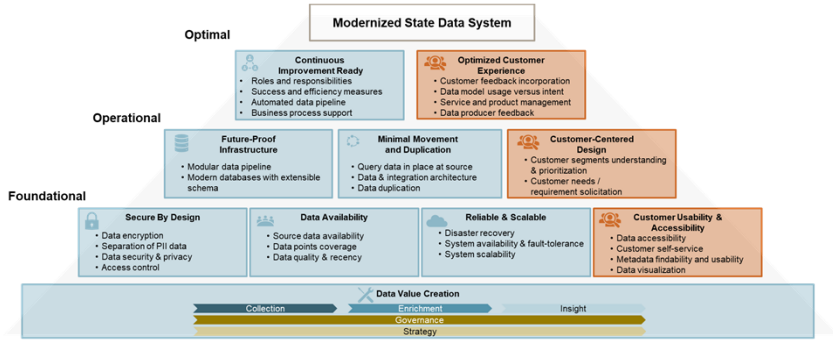
- Identify primary assessment goals
- Complete all relevant current state playbook elements
- Map key information to data value creation chain and design principles
- Rate each area based on assessment framework, process ease, and customer satisfaction
- Identify pain points, challenges, and opportunities for each element
- Complete the Summary Assessment templates and review with assessed organizational stakeholders

Dependencies on Other Playbook Elements

All current state playbook elements completed will contribute to assessment findings

Relevant Assessment Framework Principles

- All, will depend on objective of assessment



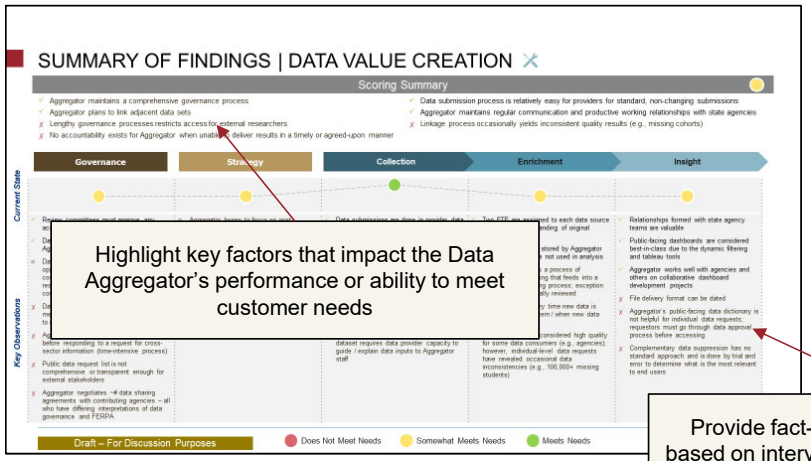
Key Inputs

- Understanding of assessment goals
- All completed playbook current state assessment elements
- Stakeholders interviews:
  - Technical lead at assessed organization
  - Business lead at assessed organization
  - Technical and business users at data provider and consumer organizations

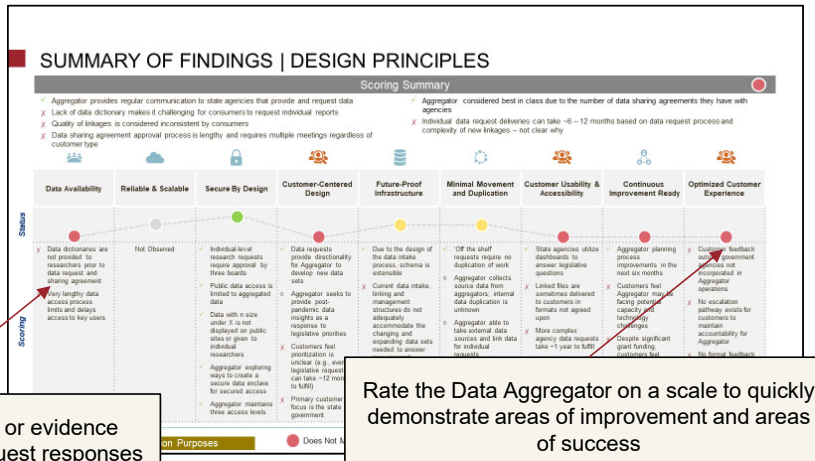
ASSESSMENT SUMMARY TEMPLATES

These templates provide a structure for summarizing findings from the assessment; areas of analysis can be included or excluded based on the focus of an assessment. Areas that "do not meet needs" can indicate potential improvement or investment opportunities, while areas that "meet needs" can be investigated further as best practices.

Data Value Creation Summary



Design Principle Summary



Highlight key factors that impact the Data Aggregator's performance or ability to meet customer needs

Provide fact-based reasoning or evidence based on interviews or data request responses that should be highlighted to key stakeholders

Rate the Data Aggregator on a scale to quickly demonstrate areas of improvement and areas of success

Leverage or develop a scale to rate data aggregator performance based on customer need, process efficiency, or technology integration

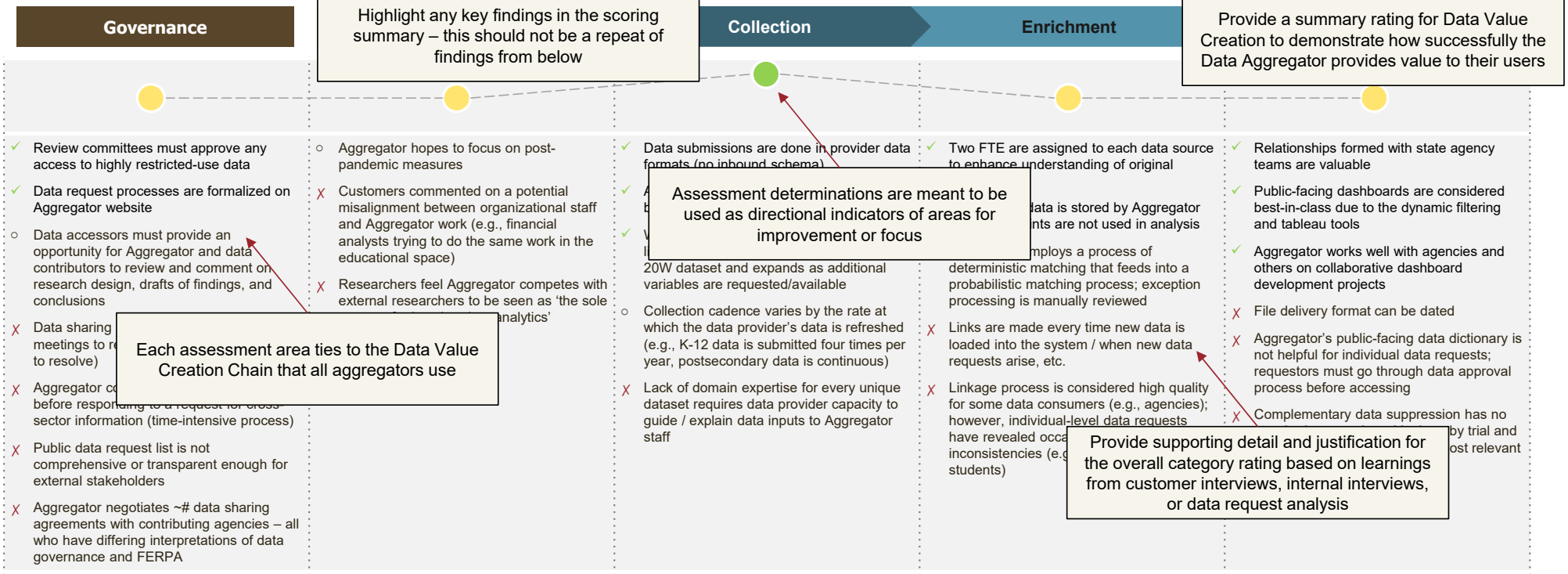
SUMMARY OF FINDINGS | DATA VALUE CREATION

Scoring Summary

- ✓ Aggregator maintains a comprehensive governance process
- ✓ Aggregator plans to link adjacent data sets
- ✗ Lengthy governance processes restricts access for external researchers
- ✗ No accountability exists for Aggregator when unable to deliver results in a timely or agreed-upon manner
- ✓ Data submission process is relatively easy for providers for standard, non-changing submissions
- ✓ Aggregator maintains regular communication and productive working relationships with state agencies
- ✗ Linkage process occasionally yields inconsistent quality results (e.g., missing cohorts)

Highlight any key findings in the scoring summary – this should not be a repeat of findings from below

Provide a summary rating for Data Value Creation to demonstrate how successfully the Data Aggregator provides value to their users



Assessment determinations are meant to be used as directional indicators of areas for improvement or focus

Each assessment area ties to the Data Value Creation Chain that all aggregators use

Provide supporting detail and justification for the overall category rating based on learnings from customer interviews, internal interviews, or data request analysis

Does Not Meet Needs | Somewhat Meets Needs | Meets Needs

SUMMARY OF FINDINGS | DESIGN PRINCIPLES

Scoring Summary

- ✓ Aggregator provides regular communication to state agencies that provide and request data
- ✗ Lack of data dictionary makes it challenging for consumers to request individual reports
- ✗ Quality of linkages is considered inconsistent by consumers
- ✗ Data sharing agreement approval process is lengthy and requires multiple meetings regardless of customer type
- ✓ Aggregator considered best in class due to the number of data sharing agreements they have with agencies
- ✗ Individual data request deliveries can take ~6 – 12 months based on data request process and complexity of new linkages – not clear why

Highlight any key findings in the scoring summary – this should not be a repeat of findings from below

Provide a summary rating for Design Principles to demonstrate how successfully the Data Aggregator delivers services

	Data Availability	Reliable & Scalable	Secure By Design	Future-Proof Infrastructure	Minimal Movement and Duplication	Customer Usability & Accessibility	Continuous Improvement Ready	Optimized Customer Experience
Status								
Scoring	✗ Data dictionaries are not provided to researchers prior to data request and sharing agreement ✗ Very lengthy data access process limits and delays access to key use	Not Observed	✓ Individual-level research requests require approval by three boards ✓ Public data access is limited to aggregated individual researchers ✓ Aggregator exploring ways to create a secure data enclave for secured access ✓ Aggregator maintains three access levels	✓ Data requests provide directionality for Aggregator to develop new data sets ○ Aggregator seeks to provide post-pandemic data insights as a response to legislati ✗ Custom prioritiza unclear legislati can take ~12 months to fulfill) ✗ Primary customer focus is the state government	✓ Due to the design of the data intake process, schema is extensible ✗ Current data intake, linking and management structures do not adequately accommodate the	✓ 'Off the shelf' requests require no duplication of work ○ Aggregator collects source data from aggregators; interna data duplication is unknown ○ Aggregator able to k data	✓ State agencies utilize dashboards to answer legislative ✗ More complex agency data requests take ~1 year to fulfill ✗ Individual researcher requests can take X – Y months to fulfill due to a lengthy data request and linking process	✓ Aggregator planning process improvements in the challenges ✗ Despite significant grant funding, customers feel experience has not improved	✗ Customer feedback outside government agencies not incorporated in Aggregator operations No escalation pathway exists for customers to maintain accountability for Aggregator ✗ No formal feedback process exists

If areas were not observed – or not observed enough to provide a rating, use a grey circle to indicate that

Provide an assessment of whether detailed findings are good, bad, or neutral for the aggregator based on the rating scale developed

Customer-focused design principles may rely more heavily on findings from customer interviews than on internal discussions

Does Not Meet Needs | Somewhat Meets Needs | Meets Needs

SOLUTION INFRASTRUCTURE OPTIONS | OVERVIEW

Playbook Element Overview

Objective: Guides organization in making thoughtful choices about P20W infrastructure strategy by summarizing the current position of the infrastructure on a spectrum and presenting options for a desired future state

Format of the Element

Two PowerPoint slide templates:

- *Solution Infrastructure Approach Options:* Provides framework to map vendors and technologies based on architect and build component options
- *Solution Infrastructure Guiding Questions:* Demonstrates some key questions to consider when discussing and evaluating potential groups of partners for solution infrastructure

How to Use the Element

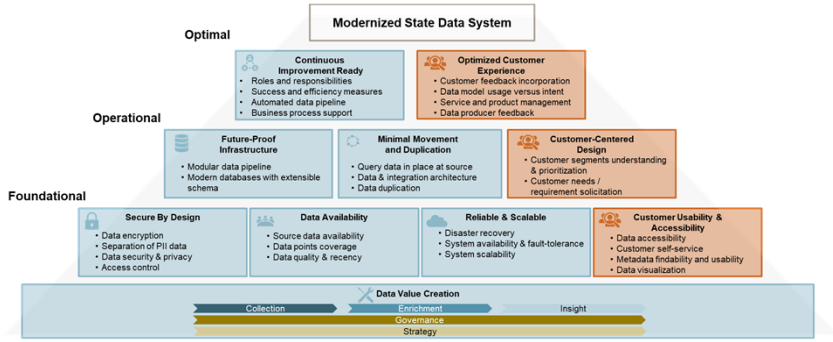
- Survey the vendors and technology offerings of interest as part of the future state infrastructure options
- Map solutions options by architect and build components onto the Approach Options tool
- Use the Guiding Questions to understand and determine the Data Aggregator's strategy, timeframe, and environment to select groups of solutions to further investigate based on the desired position of the end-state infrastructure on the Approach Options tool
- Assess suitability of different solution options

Dependencies on Other Playbook Elements

- System Capability Model
- State Systems Key Capabilities Evaluation

Relevant Assessment Framework Principles

- All, will depend on objective and scope of assessment



Key Inputs

- Understanding of assessment goals
- Stakeholders interviews:
  - Technical lead at assessed organization
  - Business lead at assessed organization
  - Technical leads at customer organizations
- Data Request results:
  - Process documentation and / or systems landscape documentation
  - Systems Inventory
- System architecture and gaps

SOLUTION INFRASTRUCTURE APPROACH OPTIONS

This tool provides a structure for contextualizing current-state infrastructure and goal 'end state' solutions. The tool can be used to guide strategic conversations about organizational goals and assessment of appropriate solution options.

This tool can be directionally useful for other Data Aggregators to understand infrastructure approaches but should not be used to make investment decisions without an independent solution infrastructure survey

Who will be the architect?

	Build and Assemble Components (Custom)	Assemble Open Source Components (Apache Hadoop, Others)	Assemble Commercial Enterprise Components (SAS, Cloudera, IBM, or Oracle)	Assemble Native Cloud Components (Google, AWS or Azure)	Implement on Pre-integrated Platform
Cloud Vendor				**Google, Microsoft, AWS** • *Good education analytics domain expertise* • *Contributes to ecosystem solution* • *Excellent support for tools* • *Future-proof* • *Low reliance on internal staff* • *Will require another integration partner*	
Education Analytics Capacity Builder / Solution		**Education Analytics** • *Strong education analytics domain expertise* • *Strong open source experience* • *High reliance on internal staff* • *Small organization* • *Custom internal solution*		**RIPL** • *Strong education analytics domain expertise* • *Existing AWS reference implementation* • *Contributes to ecosystem solution* • *High reliance on internal staff* • *Small organization*	**Coleridge / ADRF** • *Strong education analytics domain expertise* • *Existing AWS solution* • *Multi-tenant environment* • *Incomplete coverage* • *Small organization*
Development Partner		**Open Source Integrator** • *Strong understanding of specific tools* • *Low reliance on internal staff* • *Weak education analytics domain expertise* • *Custom internal solution*	**Vendor Integrators** • *Strong understanding of specific tools* • *Low reliance on internal staff* • *May require more than one partner* • *Weak education analytics domain expertise* • *Custom internal solution*	**Cloud Channel Integration Partner** • *Strong understanding of cloud tools* • *Can provide tactical support for Cloud Vendors* • *High reliance on internal staff* • *Weak education analytics domain expertise* • *Custom internal solution*	
Internal	• *High reliance on internal staff* • *Custom internal solution*	• *Increased capabilities* • *Low license & support costs* • *High reliance on internal staff* • *Custom internal solution*	• *Increased capabilities* • *High license and support costs* • *High reliance on internal staff* • *Custom internal solution*	• *Increased capabilities* • *Flexible, modern infrastructure* • *Limited experience with cloud tools* • *High reliance on internal staff*	

Legend
Black Title – Example vendors, others may exist in this space
Blue Title – Group of vendors, not vendor specific

Which set of components should we use?

Tool created based on assessment completed September 2020

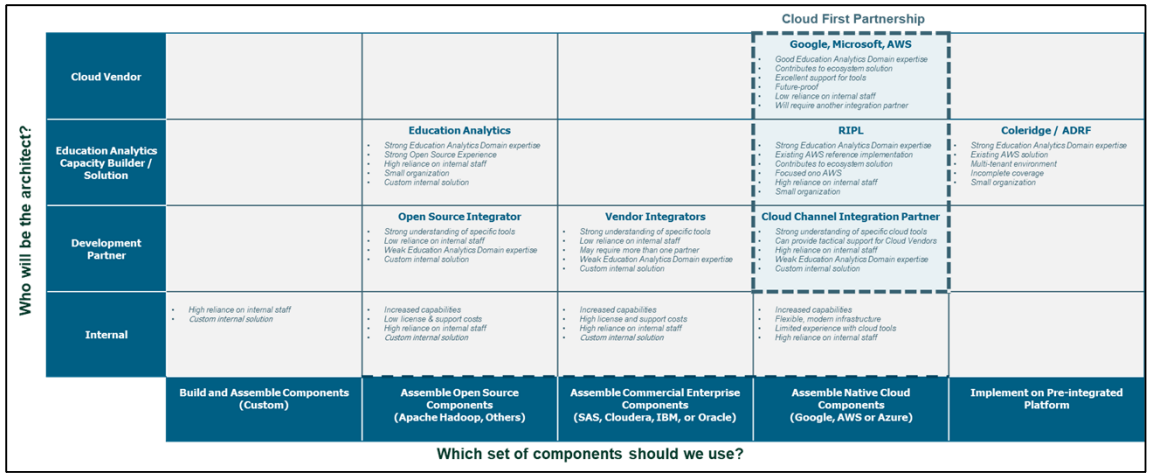
SOLUTION INFRASTRUCTURE APPROACH | GUIDING QUESTIONS

These guiding questions support a conversation about the desired end-state infrastructure with the Data Aggregator's leadership and technical team.

Guiding Questions

1. What are the strengths in your current infrastructure?
2. Does the current infrastructure support your organization's strategic goals and key customer needs?
3. What new capabilities would you like to enable?
4. Do you want to create your own solution or implement an existing product (collection of products)? Why?
5. How would you rate your organization's technical ability to design an improved solution?
6. How much scale does your system need for the future?
7. How much does cost impact your solution decisions for this implementation?

Example Infrastructure Approach



Example: After analysis, an organization may decide to select a "Cloud First Partnership" approach towards the infrastructure and underlying reasons (e.g., domain expertise, future-proof, reliance on internal staff, etc.)

Also refer to following playbook elements to determine desired end-state infrastructure approach

- *System Capability Model*
- *State Systems Key Capabilities Evaluation*

VENDOR EVALUATION TOOL | OVERVIEW

Playbook Element Overview

Objective: Structured criteria tool to inform evaluation of vendors and/or other partners based on the specific challenges and goals of the assessed organization

Target Audience: Assessed organization leaders/operators

Format of the Element

PowerPoint templates, fully incorporated in this playbook containing:

- *Vendor Summary:* Highlights vendor, key differentiators, benefits and potential drawbacks that may impact the Data Aggregator if a particular vendor was selected
- *Capability Coverage Model:* Visualizes vendor capabilities across the coverage model to provide simpler comparisons across vendors for consideration
- *Capability Detail:* Details reasoning for capability assignments for the capability coverage model due to alignment between technical and business capabilities

How to Use the Element

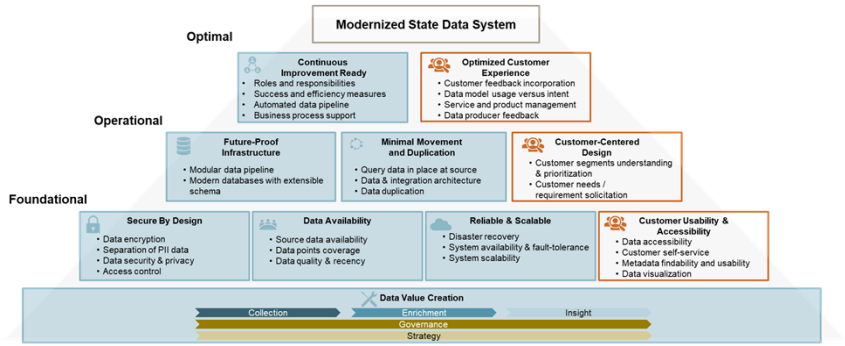
- Understand assessed organization's priorities and strategic goals
- Use Systems Architecture Tool to determine high level vendor strategy that should be targeted with the Data Aggregator
- Identify vendors that align with the strategic and technical priorities and vision of the Data Aggregator
- Conduct vendor interviews to assess capabilities across the capability model
- Summarize findings with the Vendor Evaluation Tool and review with Data Aggregator leadership

Dependencies on Other Playbook Elements

Dependent on the assessment findings, Systems Architecture Tool, and all other current state assessment elements completed

Relevant Assessment Framework Principles

- All, data request submitted to client will depend on objective of assessment



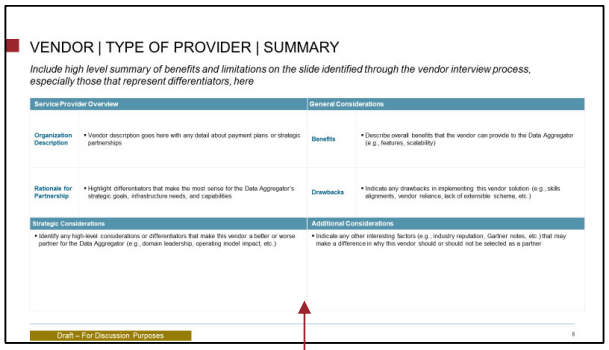
Key Inputs

- Understanding of customer landscape and priorities
- Stakeholder interviews with:
  - Data aggregator leader/operator (to direct which providers / consumers should be targeted)
  - Data providers/consumers business leaders/operators
  - Data providers/consumers technical SMEs
  - Vendors providing potential implementation solutions

VENDOR EVALUATION TEMPLATES

These templates provide a structure for summarizing findings from vendor assessments and can facilitate a conversation with Data Aggregators about potential vendor partnerships.

Vendor Summary


VENDOR | TYPE OF PROVIDER | SUMMARY

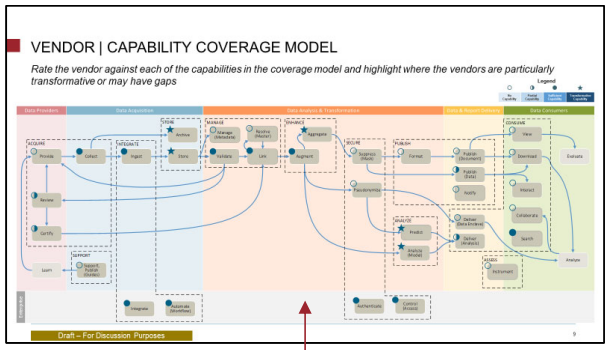
Include high level summary of benefits and limitations on the slide identified through the vendor interview process, especially those that represent differentiators, here

Service Provider Overview		General Considerations	
Organization Description	• Vendor description goes here with any detail about payment plans or strategic partnerships	Benefits	• Describe overall benefits that the vendor can provide to the Data Aggregator (e.g., features, scalability)
Rationale for Partnership	• Highlight differentiators that make the most sense for the Data Aggregator's strategic goals, infrastructure needs, and capabilities	Drawbacks	• Indicate any drawbacks in implementing this vendor solution (e.g., skills alignments, vendor reliance, lack of extensible schema, etc.)
Strategic Considerations		Additional Considerations	
• Identify any high-level considerations or differentiators that make this vendor a better or worse partner for the Data Aggregator (e.g., domain leadership, operating model impact, etc.)		• Indicate any other interesting factors (e.g., industry reputation, Gartner notes, etc.) that may make a difference in why this vendor should or should not be selected as a partner	

Draft – For Discussion Purposes

Highlight key differentiators of each vendor type and other considerations that should be discussed prior to committing to a vendor partnership

Vendor Capability Coverage Model

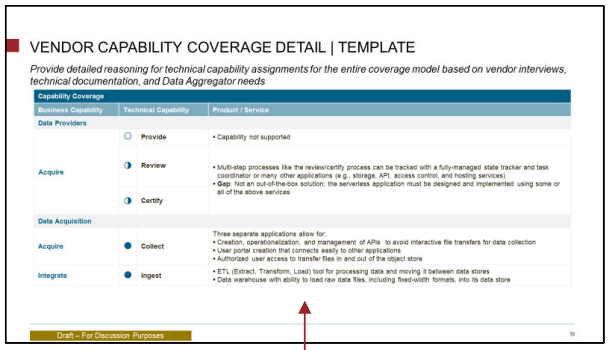

VENDOR | CAPABILITY COVERAGE MODEL

Rate the vendor against each of the capabilities in the coverage model and highlight where the vendors are particularly transformative or may have gaps

Draft – For Discussion Purposes

Map vendor capabilities across the Capability Model and compare to the Data Aggregator's needs to determine suitability of partnership

Vendor Capability Coverage Detail


VENDOR CAPABILITY COVERAGE DETAIL | TEMPLATE

Provide detailed reasoning for technical capability assignments for the entire coverage model based on vendor interviews, technical documentation, and Data Aggregator needs

Capability Coverage			
Business Capability		Technical Capability	Product / Service
Data Providers			
Acquire	○	Provide	• Capability not supported
	◑	Review	• Multi-step processes like the review/certify process can be tracked with a fully-managed state tracker and task coordinator or many other applications (e.g., storage, API, access control, and hosting services) • **Gap**: Not an out-of-the-box solution; the serverless application must be designed and implemented using some or all of the above services
	◑	Certify	
Data Acquisition			
Acquire	●	Collect	Three separate applications allow for: • Creation, operationalization, and management of APIs to avoid interactive file transfers for data collection • User portal creation that connects easily to other applications • Authorized user access to transfer files in and out of the object store
Integrate	●	Ingest	• ETL (Extract, Transform, Load) tool for processing data and moving it between data stores • Data warehouse with ability to load raw data files, including fixed-width formats, into its data store

Draft – For Discussion Purposes

Bolster reasoning for assessed vendor technical capabilities based on findings from technical documentation and vendor interviews

VENDOR | TYPE OF PROVIDER | SUMMARY

Include high level summary of benefits and limitations on the slide identified through the vendor interview process, especially those that represent differentiators, here.

Service Provider Overview		General Considerations	
Organization Description	▪ *Vendor description goes here with any detail about payment plans or strategic partnerships*	**Benefits**	▪ Describe overall benefits that the vendor can provide to the Data Aggregator (e.g., features, scalability)
Rationale for Partnership	▪ *Highlight differentiators that make the most sense for the Data Aggregator's strategic goals, infrastructure needs, and capabilities*	**Drawbacks**	▪ Indicate any drawbacks in implementing this vendor solution (e.g., skills alignments, vendor reliance, lack of extensible schema, etc.)

Strategic Considerations	Additional Considerations
▪ Identify any high-level considerations or differentiators that make this vendor a better or worse partner for the Data Aggregator (e.g., domain leadership, operating model impact, etc.)	▪ Indicate any other interesting factors (e.g., industry reputation, Gartner notes, etc.) that may make a difference in why this vendor should or should not be selected as a partner

CAPABILITY MODEL | ANALYSIS RUBRIC

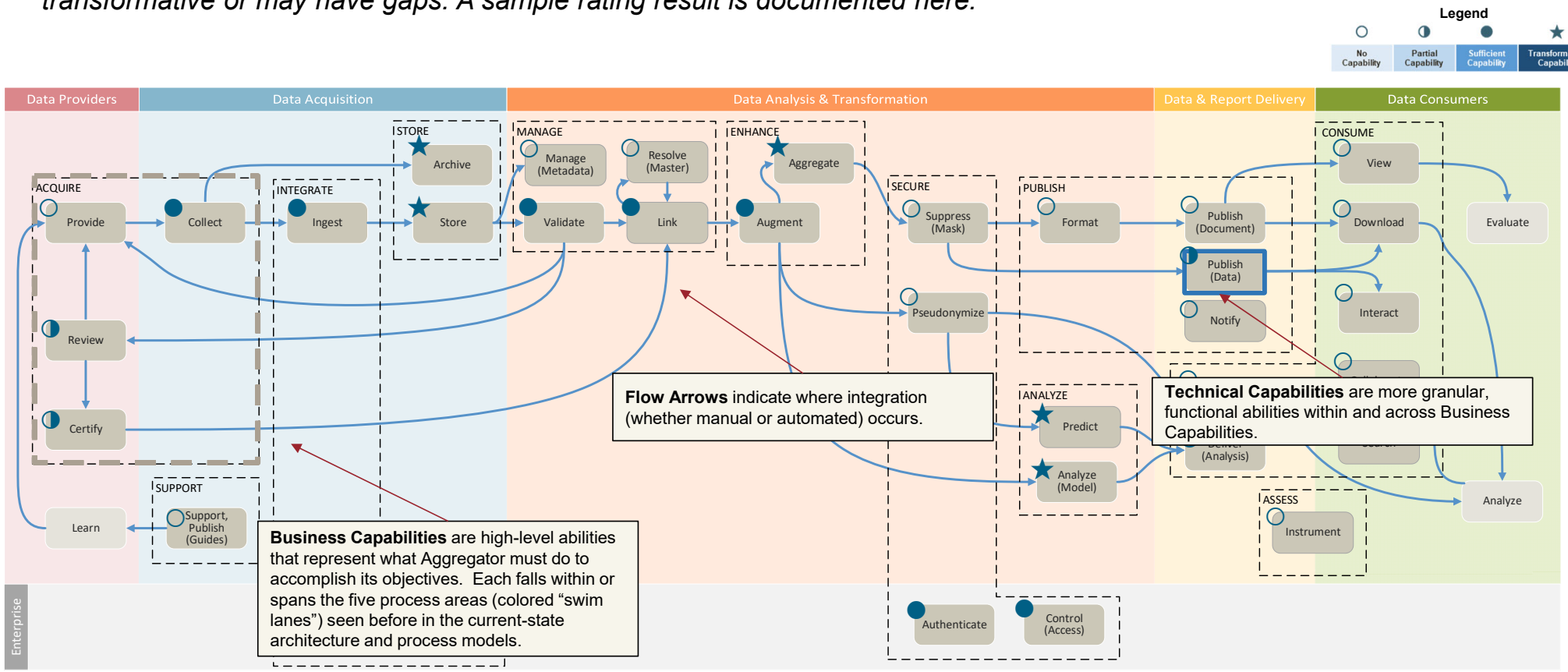
The Analysis Rubric is used to indicate the ability of target solutions and solution providers to meet a singular Data Aggregator's requirements aligned with core business capabilities.

	⬚	○	◑	●	★
Capability Coverage	**Not Assessed**	**None**	**Partial**	**Sufficient**	**Transformative**
Rating Criteria	• Unable to determine / not assessed	• Does not deliver the business capability (third-party / partner offerings may still exist to fill this gap, but not integrated into a single vendor's offering)	• Ability to deliver the business capability is incomplete or limited • May contribute to a more complete solution, in combination with others' offerings	• Ability to deliver the business capability is adequate • Meets the Data Aggregator's current needs	• Ability to deliver the business capability is exceptional or industry-leading • May deliver complete capability and/or significantly increase the Data Aggregator's capability maturity

Capability coverage exists if 1) there is potential to replace at least part of the Data Aggregator's existing technology/process or 2) there is potential to improve the Data Aggregator's capability maturity

VENDOR | CAPABILITY COVERAGE MODEL & SAMPLE USE

Rate the vendor against each of the capabilities in the capability model and highlight where the vendors are particularly transformative or may have gaps. A sample rating result is documented here.



VENDOR CAPABILITY COVERAGE DETAIL | TEMPLATE

Provide detailed reasoning for technical capability assignments for the entire coverage model based on vendor interviews, technical documentation, and Data Aggregator needs.

Capability Coverage			
Business Capability	**Technical Capability**		**Product / Service**
Data Providers			
Acquire	○	**Provide**	▪ Capability not supported
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	◑	**Certify**	
Data Acquisition			
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Integrate	●	**Ingest**	▪ ETL (Extract, Transform, Load) tool for processing data and moving it between data stores ▪ Data warehouse with ability to load raw data files, including fixed-width formats, into its data store

Complete the capability coverage detail model for all business capabilities

IMPLEMENTATION ROADMAP | OVERVIEW

Playbook Element Overview

Objective: Provides template for presenting, prioritizing, and order of completion of initiatives based on stakeholder interest, funding technical capabilities, and complexity

Target Audience: Individuals assessing target organization and assessed organization leadership

Format of the Element

PowerPoint templates, fully incorporated in this playbook containing:

- *Project Charter:* Describes the project, key milestones, and dependencies or key steps that must take place in order to complete the project
- *Prioritization Guidance:* Demonstrates how activities and initiatives can be prioritized based on stakeholder need
- *Roadmap:* Identifies activities and / or initiatives to complete on a time-bound basis

How to Use the Element

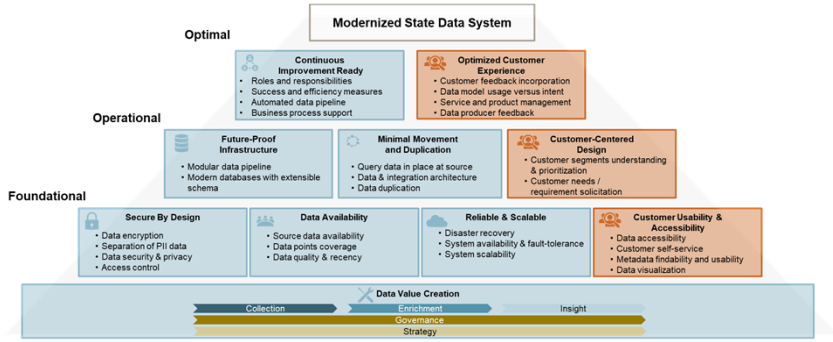
- Identify assessed organization's priorities and strategic goals
- Create list of potential optimization initiatives for assessed organization
- Complete project charters to flesh out project ideas
- Sort list of improvement initiatives by prioritization developed based on prioritization guidance
- Identify high potential / high value initiatives
- Determine time to complete each initiative and any dependencies between
- Complete roadmap and activity dependencies based on prior conclusions

Dependencies on Other Playbook Elements

Implementation roadmap is dependent on the assessment findings and all other current state assessment elements completed

Relevant Assessment Framework Principles

- All, data request submitted to client will depend on objective of assessment



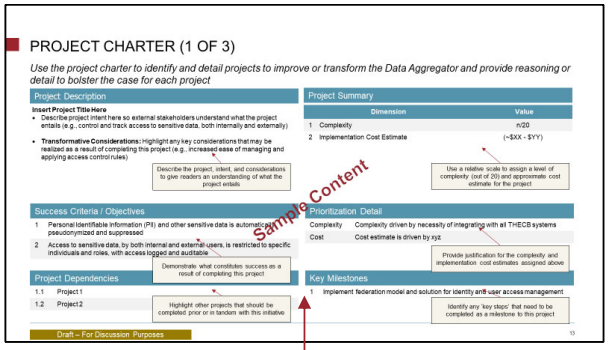
Key Inputs

- Understanding of customer landscape and priorities
- Stakeholder interviews with:
  - Data aggregator leader/operator (to direct which providers / consumers should be targeted)
  - Data providers/consumers business leaders/operators
  - Data providers/consumers technical SMEs
  - Vendors providing potential implementation solutions

IMPLEMENTATION ROADMAP TEMPLATES

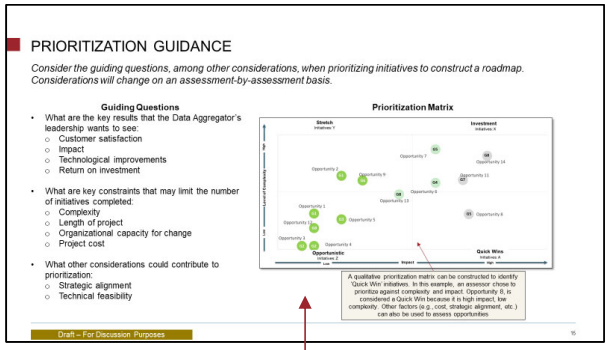
These templates provide a structure for summarizing improvement opportunities, prioritizing, and creating a high-level project plan that can facilitate a conversation with Data Aggregators about potential organizational and project improvements.

Project Charters



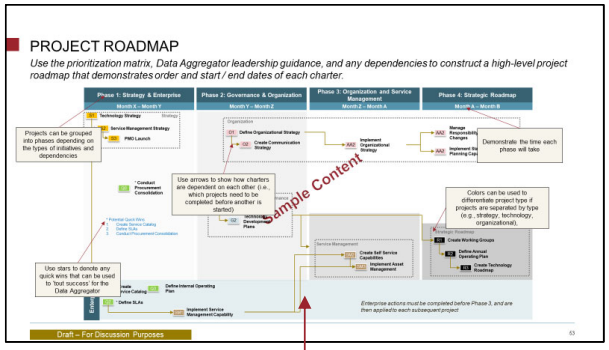
Detail each improvement opportunity on the project charters and highlight key dependencies, complexity, project cost, risks, and any other considerations

Prioritization Guidance



Consider the highlighted prioritizations that could be used to construct the Project Roadmap

Project Roadmap



Map opportunities for improvement in order of completion based on individualized prioritization and project charters

PROJECT CHARTER (1 OF 2)

Use the project charter to identify and detail projects to improve or transform the Data Aggregator and provide reasoning or detail to bolster the case for each project.

Project Description

Insert Project Title Here

- Describe project intent here so external stakeholders understand what the project entails (e.g., control and track access to sensitive data, both internally and externally)
- **Transformative Considerations:** Highlight any key considerations that may be realized as a result of completing this project (e.g., increased ease of managing and applying access control rules)

Describe the project, intent, and considerations to give readers an understanding of what the project entails

Project Summary

	Dimension	Value
1	Complexity	n/20
2	Implementation Cost Estimate	(~$XX - $YY)

Use a relative scale to assign a level of complexity (out of 20) and approximate cost estimate for the project

Success Criteria / Objectives

1	Personal Identifiable Information (PII) and other sensitive data is automatically pseudonymized and suppressed
2	Access to sensitive data, by both internal and external users, is restricted to specific individuals and roles, with access logged and auditable

Demonstrate what constitutes success as a result of completing this project

Prioritization Detail

Complexity	Complexity driven by necessity of integrating with all internal systems
Cost	Cost estimate is driven by xyz

Provide justification for the complexity and implementation cost estimates assigned above

Project Dependencies

1.1	Project 1
1.2	Project 2

Highlight other projects that should be completed prior or in tandem with this initiative

Key Milestones

1	Implement federation model and solution for identity and user access management

Identify any 'key steps' that need to be completed as a milestone to this project

PROJECT CHARTER (2 OF 2)

Key Requirements (Capability Model & Discovery)

Project Title

1. Personal Identifiable Information (PII) and other sensitive data must be protected using all necessary security controls
2. A role-based and organization-based access control mechanism must limit access to data and services to authorized users.
3. Access to sensitive data by internal personnel is managed by a system with appropriate security controls, such as separation of duties, role-based access control, access and management logging and audit capabilities.

Describe any requirements or constraints that must be considered throughout the implementation of this project

Opportunities (Discovery)

Identity and Access Management

- Determine federation model and solution for identity and user access management
- Implement an enterprise Digital Loss Prevention system to further reduce risks to data privacy

Tie any opportunities back to opportunities discovered in the assessment phase of the project

Key Decisions

1	Should the Data Aggregator use cloud services or other types of software for enterprise-wide applications?
2	Should partner organizations and institutions be able to internally delegate access to the Data Aggregator's portals?

Describe key decisions that need to be answered prior to project completion

Risks

1	Lengthy/delayed project acts as bottleneck for downstream data modernization projects
2	Security risks due to improper identity & access management configuration

Identify any risks that could challenge project execution or completion – ensure there are mitigations to the risks prior to beginning the project

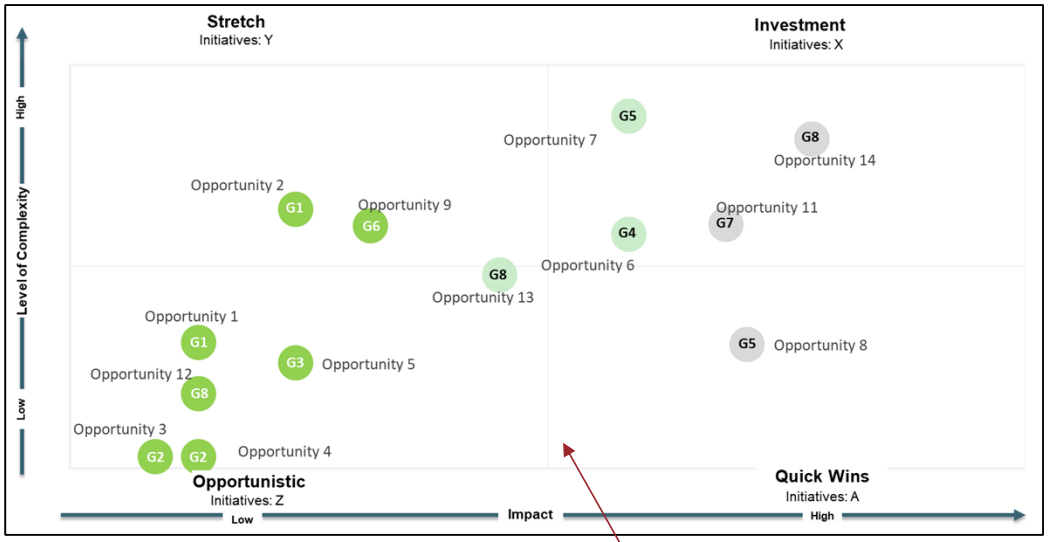
PRIORITIZATION GUIDANCE

Consider the guiding questions, among other considerations, when prioritizing initiatives to construct a roadmap. Considerations will change on an assessment-by-assessment basis.

Guiding Questions

- What are the key results that the Data Aggregator's leadership wants to see:
  - Customer satisfaction
  - Impact
  - Technological improvements
  - Return on investment
- What are key constraints that may limit the number of initiatives completed:
  - Complexity
  - Length of project
  - Organizational capacity for change
  - Project cost
- What other considerations could contribute to prioritization:
  - Strategic alignment
  - Technical feasibility

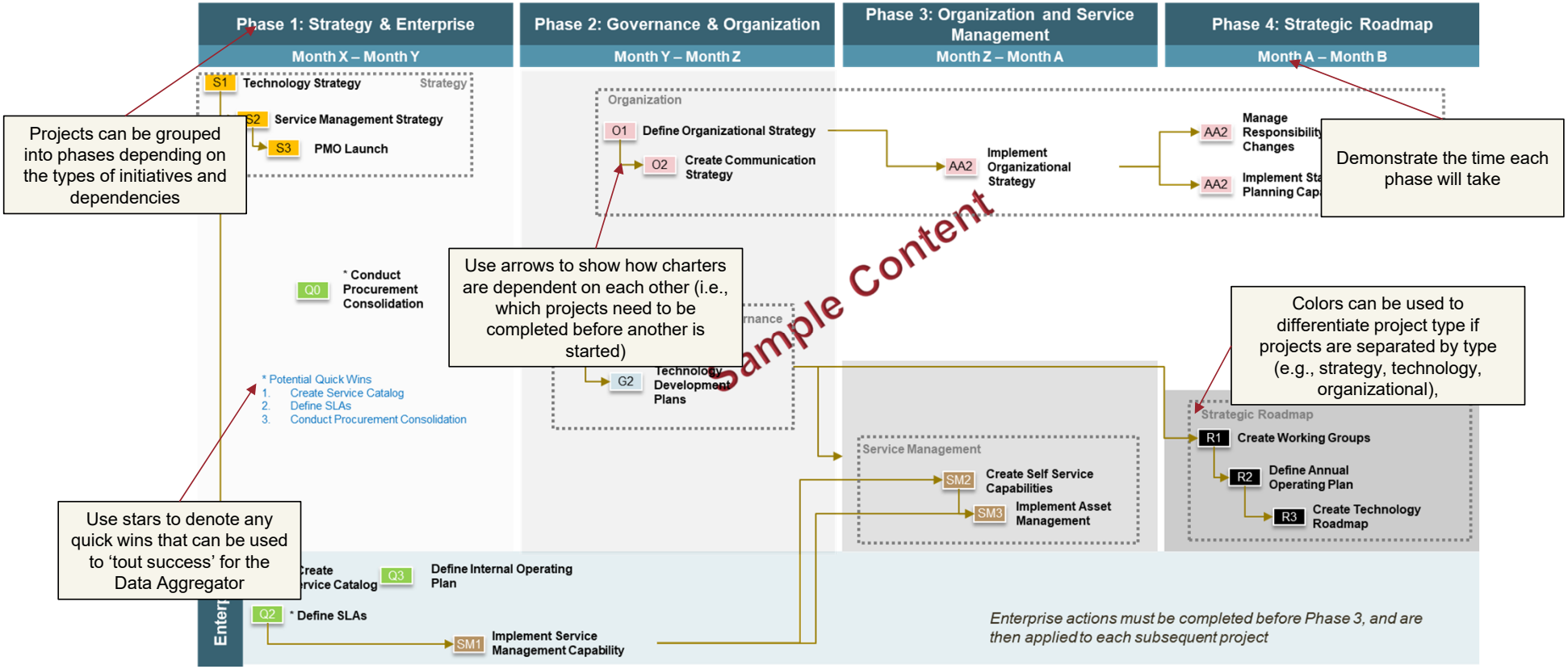
Prioritization Matrix



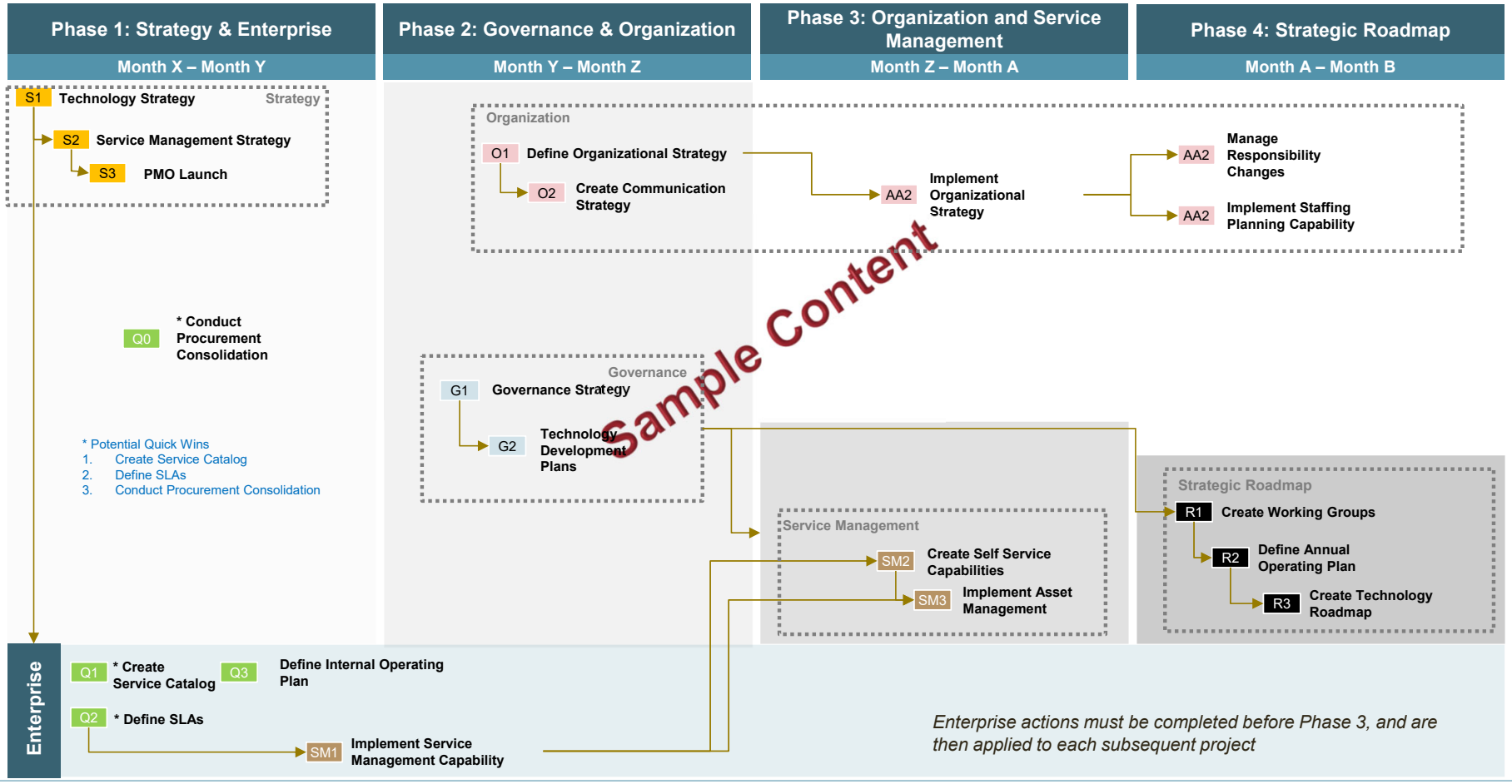
A qualitative prioritization matrix can be constructed to identify 'Quick Win' initiatives. In this example, an assessor chose to prioritize against complexity and impact. Opportunity 8, is considered a Quick Win because it is high impact, low complexity. Other factors (e.g., cost, strategic alignment, etc.) can also be used to assess opportunities

PROJECT ROADMAP

Use the prioritization matrix, Data Aggregator leadership guidance, and any dependencies to construct a high-level project roadmap that demonstrates order and start / end dates of each charter.



PROJECT ROADMAP | TEMPLATE



APPENDIX

State Data Use Case Examples

STATE DATA USE CASES EXAMPLES | USE CASE A

Use Case A: Provide better linkages and longitudinal views	
Success scenario: Users can access and easily navigate purposefully-linked, granular data about students who move across types and levels of institutions and the workforce to answer research questions to inform policy, strategy and funding. **For example: I want to…** 1) I want to see clear linkages to post-graduation outcomes so that I can make informed changes to degrees, depts, student services, etc. to promote credential to career pathway, especially for low-income, minority and first-generation students 2) I want to evaluate the value of degree paths at my institution by looking at post-certification/degree earnings and education debt by students type and pathway against my peers so I can make adjustments and share the value story with funders 3) I want to know what happened to the students who transferred from my institution: with information on their paths (time to completion, degree, etc.) and outcomes, so I can adjust services and strengthen connections and alignment to other institutions 4) I want to know the background (high school, test scores, prior college experience, etc.) of the students who have succeeded or dropped out of my institution, as quickly as possible, so that we can be better support student success	"*We want more statewide high school data. We want more dual credit information, what high school they came from, etc. WE want to push the agreement between data aggregators to do more, which can help solve the issue of matching.*" *"Create a transfer student report. Right now I have to piece together on my own with NSC data. This would be really helpful to the community colleges of the state."* "*We are pulling together pieces of information instead of having one source of truth. I spend so much free time pulling common data sets to help educate my team on where and how to get data.*" *"Between K-12, postsecondary, and workforce data, we have to load and transform 3 times before it can be leveraged. We built a predictive analytics tool of top of the data aggregator's data. If the data aggregator did that, it would be a game changer."*

STATE DATA USE CASES EXAMPLES | USE CASE B

Use Case B: Support continuous improvement	
Success scenario: High quality data is provided more frequently and at a granular level that allows institutions to evaluate performance across their cohort to identify patterns in programs and initiatives that produce quality student outcomes. Data aggregator understands institutional needs and proactively provides guidance when they find evidence of things that are working. **For example: I want to…** 1) I want to understand on a quarterly basis how my key performance indicators (including enrollment, time to graduation, graduation, etc.) compare to other state institutions, and in particular a cohort of peers that I have defined, so that I know where I have opportunity for improvement 2) I want to drill down into the data in areas where my peers are having success so that I can develop a set of recommended actions that we might explore or take 3) I want to access research that others have already produced and the stories around the data that will help me understand whether solutions/changes/actions are right for my institution as I look to improve student outcomes 4) I want an organization with a view across the state to point out findings and stories of success because I don't have the time to do this analysis myself 5) I want reliable, high quality data on programs at peer institutions so I can rate program vitality, driving program creation, funding appropriation	"*What comes back from the data aggregator is just a slice of what was submitted – so we don't really have a strong need to use [data aggregator's data].*" "*Improve the timeliness of the data. What we get is months or years out because of certification.*" *"Data aggregator hasn't had the appetite to get to student level data due to FERPA. But it's all about the student level data for the institutions. Ultimately, we need to design student services using data but that's not supported by the data aggregator due to level of granularity."*

STATE DATA USE CASES EXAMPLES | USE CASE C

Use Case C: Collaborate and share strategic insights	
Success scenario: The data aggregator leverages their central role and statewide view to act as a connector and strategic partner to support institutions that are looking for data-driven insights, best practices and projections. **For example: I want to…** 1. I want to find and access data sets and code that others have produced to generate forecasts about how [example: new legislative policies, changes to enrollment requirements, etc.] might impact my KPIs 2. I want a partner who has access to a state level view of what different institutions are asking or trying and who is able to do data "sense-making" and share insights, including stories that add context to data, so I can more easily learn things that will improve my strategic and operational decision-making 3. I want to avoid putting together a research report from scratch on questions that others have already researched, in whole or in part 4. I want to get connected to peer groups that can give me feedback on how to use state-wide data	*"Engagement with the data aggregator to this point is mostly transactions – troubleshooting no reports, new report requirements, etc. It's not really strategic."* *"I would like to see examples on the website of analytical models – highlight how things are being done by others."* *"If I have questions, the data aggregator team just refer you back to the data provider. But we aren't involved in submission, so we don't have context to know what to do"* *"Could we use the transparency framework to share data sets and the story behind what happened to drive good outcomes at other schools?"*

STATE DATA USE CASES EXAMPLES | USE CASE D

Use Case D: More easily fulfill state and federal reporting requirements	
Success scenario: There are newer, better processes for submitting data to the data aggregator supported by defined change management practices that include user feedback. Users have access to some data prior to state-wide certification. **For example: I want to…** 1) I want options for how to submit our data: it would be easier if I could deliver data in a SQL file (though I know that might be too advanced for small community colleges) 2) I want to receive timely, consistent communication and clear, complete documentation about proposed changes to reporting requirements so that I might provide feedback on impact or otherwise try to lessen the impact on my resources - without compromising the value of the new requirements 3) I don't want to wait a long time for statewide data verification. I want someone to help the institutions that consistently have trouble submitting their data, OR, I want to have access with an understanding of where data is still incomplete 4) I want a single portal/process for report submission. Outside of the current reporting, we currently email flat files to various points of contact at the data aggregator 5) I keep a copy of the data submitted to the data aggregator to assist in national reporting requirements	"*Don't just initiate changes at ad hoc times during the year: we spend a lot of time reprogramming.*" "*In the interest of getting timely data, I think people are relaxing more about whether everyone has to be certified and more accepting of getting data with notations about how complete it is.*" *"It takes us most of the semester to scrub data and make sure it's clean and we are always right up against the data aggregator's deadline."*

STATE DATA USE CASES EXAMPLES | USE CASE E

Use Case E: Use demographics and financial aid details to analyze data	
Success scenario: To better align with state goals, users need to access more detailed data, and in particular demographic details to support equity and financial aid data to understand and control education costs. **For example: I want to…** 1) To support our goals around equity and inclusion, I want to filter enrollment performance measures by demographic data and see how our college is performing in line with my geographic area and relative to my peers 2) To support our efforts to close the achievement gap for low income, minority and first-generation students, I want to see how our outcome measures compare to other colleges (making sure data element definitions are the same across institutions) 3) We could be doing much more with financial aid data. I want to be able to look at trends that show the pathways of students alongside their financial aid to better understand how financial aid or emergency financial aid can support student outcomes	"*I'm trying to understand achievement gaps and what helps certain kids graduate and be successful versus those who don't graduate.*" *"We can't ask a question of the data and get the answers that we need. We need to download, add other sources and manipulate and then document for ourselves what we did."* *"Financial data is very difficult to find and download to do analysis."*

STATE DATA USE CASES EXAMPLES | USE CASE F

Use Case F: Perform better forecasting	
Success scenario: By providing users access to richer data, more frequently and proactively, the data aggregator recognizes and supports predictive analytics and innovative modeling approaches that users have adopted **For example: I want to…** 1) I want to understand macro trends in education to evolve our service delivery model: where is Higher Ed going, with online learning, dual enrollment, HS college level courses, etc. Who are the students and what are they asking for? 2) I want a single source of reliable data to feed our team's predictive model on high demand fields so I can make informed investments in departments and faculty recruiting 3) I want to receive notification from a trusted data source(s) that updated data is available every semester (or more) so that I have greater confidence that our forecasts are current and relevant	"*It would be great if we could just get data automatically and it's updated. We don't get any notification that new data is available."* *"Data aggregator should be an expert on education trends. You can't do that if you are always looking way back in the rearview mirror."* *"A great benefit would be to make the interactive data more downloadable for Tableau, PowerBI, Infographics. Right now it's too complicated."*

STATE DATA USE CASES EXAMPLES | USE CASE G

Use Case G: Answer strategic policy questions	
Success scenario: Rich, linked data is more easily accessible to a broad number of users, tied to real business decisions that need to be made as well as to policy insights and decisions **For example: I want to…** 1) I want to access financial aid and course completion data across colleges so that I can produce an annual report on how efficiently students are completing degrees of value in our state 2) I want easier, cheaper access to secure, detailed student data in order to research strategic policy questions. This includes a full view of available relational data sets, data definition consistency across years of historical data, and better alignment between our state's other official data providers 3) When policy changes are made, I want reporting requirements to be reflective of what institutions will need to manage for success and not just what legislators need to measure success 4) I want an easy to navigate interface so I can quickly find data visualizations that help me understand how my institution is performing relative to my peers on issues related to recent policy changes	"*We recently requested macro graduation rates across the state. What does our rank look like across the state, including by student demographics. Our request was denied, and no explanation given.*" *"We engage with data through the data aggregator, which has all manner of issues – it's not developed for the democratization of data. And the data is 80% of what we want, but we need additional tools to access."* *"We don't have the time or resources for in-depth analysis and comparisons so I'm just trying to help leadership with short and sweet views"*

STATE DATA USE CASES EXAMPLES | USE CASE H

Use Case H: Understand and measure educational outcomes	
Success scenario: A user can access and utilize linked, granular data about various entities (e.g., students, institutions from Pre-K to the workforce, teachers, etc.), in order to understand the impact of different variables on educational outcomes to understand the success of educational programs and policies. **For example: I want to…** 1) I want to see clear linkages to post-graduation outcomes so that I can provide information to lawmakers, policymakers, and lobbyists to advocate informed change on a statewide basis 2) I want to evaluate the value of public and private institutions by looking at post-graduation outcomes against peer organizations so I can make funding recommendations to lawmakers 3) I want to know how the level and type of teacher education impacts success of the students they teach to advocate for changes at postsecondary institutions 4) I want to know the long-term outcomes of students who take technical courses in high school, technical centers, and postsecondary institutions based on where they took classes, how many they took, and how general or specific their course of study was to craft potential 'best practice' course recommendations for national advocacy groups	"*We want Pre-K data connected to outcomes in third grade to understand which programs its important to fund especially because of the legislative and private focus on funding these programs.*" *"It's important to include data on students who attend K-12 and then go straight to the workforce. Right now it's a black box for 20 to 30 percent of K-12 student outcomes."* "*We need student, teacher, or institution-level data at a small cell-size to understand causality.*" *"We need entity-level comparison data in order to have a comparison group to test hypotheses."*

STRATEGIC USE CASES | USE CASE I

Use Case I: Assess programmatic outcomes	
Success scenario: A user can understand the impact of different variables on a constituent's life journey and programmatic outcomes of select state services and policies via access to linked, granular data about various entities (e.g., students, constituents, state sponsored programs, etc.). **For example: I want to…** 1) I want to understand what happens to a constituent after they are done using my services – what jobs do they get? How long do they stay in those jobs? Do they increase their education afterwards? 2) I want to understand what happens when I refer individuals to other state services – do the constituents use those services? Why or why not? 3) I want to understand where pools of talent lie in the state – what is the output of our education and workforce pipelines for particular areas? 4) I want to know how programs set constituents up for success or failure (e.g., criminal justice, health services, etc.) – do they work?	"*We want to track outcomes of incarceration transitional programs to understand recidivism rates and how these tie to other parts of the constituent journey.*" *"We need to know how referrals work for TN Cares programs – what works and why?"* "*We need to be able to demonstrate what areas of the state hold the most promise for potential employers who want to locate here.*" *"We view our programs as temporary services, and we want to understand what happens to the people who never return to receive those services – what happened to them and why were they successful?"*